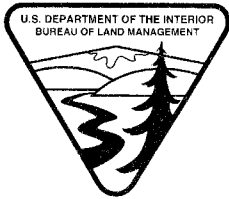




U.S. Department of the Interior
Bureau of Land Management
Wyoming State Office

Rawlins Field Office

August 2000



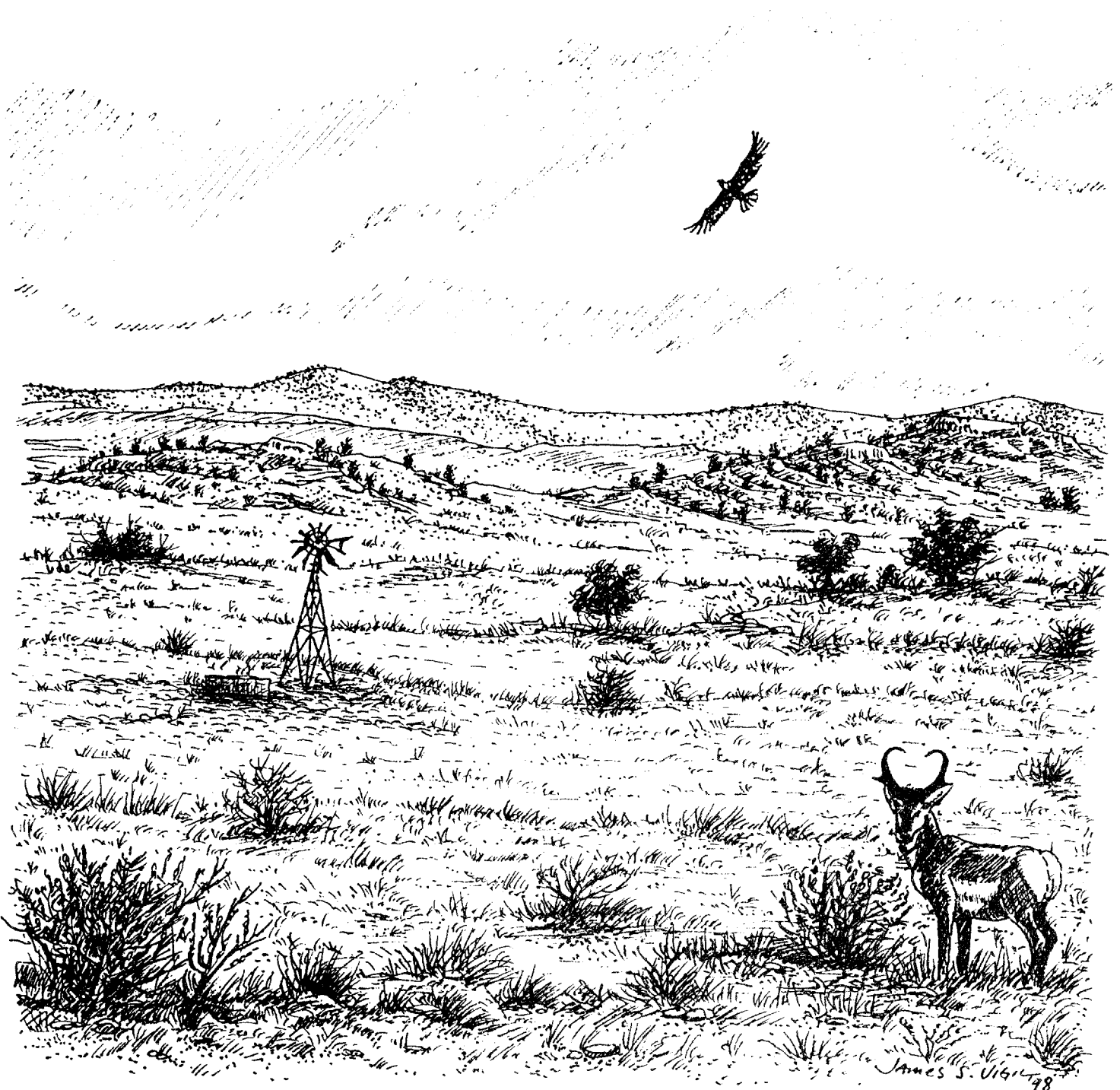
RECORD OF DECISION

Environmental Impact Statement

South Baggs Area

Natural Gas Development Project

Carbon County, Wyoming



MISSION STATEMENT

It is the mission of the Bureau of Land Management to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.



United States Department of the Interior

BUREAU OF LAND MANAGEMENT

Wyoming State Office
P.O. Box 1828
Cheyenne, Wyoming 82003-1828

In Reply Refer To:

1793 (930)
South Baggs ROD

8 AUG 2000

Dear Reviewer:

This Record of Decision (ROD) for the proposed South Baggs Area Natural Gas Project located in Carbon County, Wyoming, is provided for your information and use. The ROD defines the decision, explains the rationale (including key management considerations), and includes standards, mitigation, and monitoring requirements for the South Baggs Area Natural Gas Project. The Bureau of Land Management (BLM) decision is subject to appeal as explained in the decision.

On April 29, 1999, the BLM released the draft Environmental Impact Statement (EIS). On March 31, 2000, the final EIS for the South Baggs Area Natural Gas Project was released. The South Baggs Area EIS was prepared pursuant to the National Environmental Policy Act and other regulations and statutes to fully disclose the potential environmental impacts which could result from implementation of the South Baggs Area Natural Gas Project and to solicit public comments and concerns. The EIS process is designed to inform the public and to provide opportunity to comment on a proposed development and reasonable alternatives proposed for implementation on public lands. The EIS discloses, through detailed analysis, the potential impacts associated with implementing the proposal or alternatives and includes reasonable opportunities to mitigate potential impacts.

A copy of this ROD has been sent to affected government agencies and to those persons who either responded to public scoping, commented on the EIS, or otherwise indicated to BLM that they wished to receive a copy of the EIS/ROD. Copies of the ROD are available to the public at the following locations:

Bureau of Land Management
Wyoming State Office
5353 Yellowstone Road
P.O. Box 1828
Cheyenne, Wyoming 82003
Telephone (307) 775-6256

Bureau of Land Management
Rawlins Field Office
1300 North Third Street
P.O. Box 2407
Rawlins, WY 82301
Telephone (307)324-4200

The BLM would like to thank the individuals and organizations who provided suggestions and comments on the draft and final EIS. Your help has been invaluable in preparing the EIS and the attached ROD.

Sincerely,


Alan R. Pierson
State Director

Attachment

**DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Wyoming State Office**

**RECORD OF DECISION
FOR THE
ENVIRONMENTAL IMPACT STATEMENT**

on the

**SOUTH BAGGS AREA
NATURAL GAS DEVELOPMENT PROJECT**

Carbon County, Wyoming

August 2000

RECORD OF DECISION

Table of Contents

	Page
RECORD OF DECISION	1
DECISION	1
APPROVED PROJECT COMPONENTS	4
SUMMARY OF THE SOUTH BAGGS NATURAL GAS DEVELOPMENT PROPOSED ACTION AND ALTERNATIVES	4
Proposed Action	5
Alternative A	5
Alternative B	6
Alternative C - No Action	6
Alternatives Considered But Eliminated From Detailed Analysis	7
MANAGEMENT CONSIDERATIONS/RATIONALE FOR DECISIONS	7
COMPLIANCE AND MONITORING	12
APPEAL	13
Figure 1 Area Map - Location of the South Baggs Analysis Area in Southcentral Wyoming.	2

APPENDICES

APPENDIX A: ENVIRONMENTAL STANDARDS, PROCEDURES, AND REQUIREMENTS FOR IMPLEMENTATION OF THE SOUTH BAGGS AREA NATURAL GAS DEVELOPMENT PROJECT

SECTION I	GENERAL PRE-AUTHORIZATION AND/OR OTHER ADMINISTRATIVE REQUIREMENTS	A-1
SECTION II	APPLICABLE APPLICANT-COMMITTED CONSTRUCTION, OPERATION, AND RESOURCE PROTECTION PRACTICES, AND APPLICABLE EIS- IDENTIFIED MITIGATION AND MONITORING MEASURES	A-4
SECTION III	RECLAMATION GUIDELINES	A-26
SECTION IV	HAZARDOUS MATERIALS MANAGEMENT PLAN	A-45
APPENDIX B:	U.S.FISH AND WILDLIFE SERVICE CORRESPONDENCE	B-1

**BUREAU OF LAND MANAGEMENT
RAWLINS FIELD OFFICE**

**RECORD OF DECISION
for
SOUTH BAGGS AREA
NATURAL GAS DEVELOPMENT PROJECT
CARBON COUNTY, WYOMING
ENVIRONMENTAL IMPACT STATEMENT**

This document records the decision made by the Bureau of Land Management for managing public land surface and federal mineral estate in the *South Baggs Area Natural Gas Development Project*. The South Baggs project area is located in Carbon County, Wyoming within Townships 12 and 13 North (T12-13N), Ranges 92 and 93 West (R92-93W), 6th Principal Meridian. The project area encompasses approximately 12,352 acres of mixed federal, State, and private lands. Of this total, approximately 10,067 acres are managed by the U.S. Department of the Interior (USDI) Bureau of Land Management (BLM) and 2,285 acres are private lands. See Figure 1 for the project location.

DECISION

The Bureau of Land Management (BLM) approves the South Baggs Area Natural Gas Development Project Operator's Proposed Action for the development and production of natural gas on public lands, as modified by the mitigation and monitoring provisions outlined herein. The decision approving the Proposed Action recognizes that the area of the South Baggs project has had natural gas development since 1945, and that there are other important natural resources and values within the area which require consideration and protection from unnecessary or undue degradation.

Based on the environmental analysis of the proposed action and alternatives documented in the *South Baggs Area Natural Gas Development Project Draft Environmental Impact Statement* (DEIS), May 1999, and the *South Baggs Area Natural Gas Development Project Final Environmental Impact Statement* (FEIS), April 2000, the BLM's decision incorporates restrictions and mitigation measures in consideration of Federal, State, and local agencies, and public comments received on the DEIS and FEIS. The decision balances the development of natural gas to meet public needs, while providing maximum consideration for protection of the natural and human environment, to result in the least degree of an irreversible or irretrievable commitment of natural resources and values.

The selection of the Proposed Action incorporates compliance with the Great Divide Resource Area Resource Management Plan (RMP) and implementation of various mitigation measures. Such measures are included in this Record of Decision (ROD), Appendix A, and include the following: (Section II) Applicable Applicant-Committed Construction, Operation, and Resource Protection Practices, and Applicable EIS-Identified Mitigation and Monitoring Measures, (Section III) Reclamation Guidelines, and (Section IV) Hazardous Materials Management Plan. The BLM has concluded that these detail a complete listing of practicable measures to reduce

RECORD OF DECISION

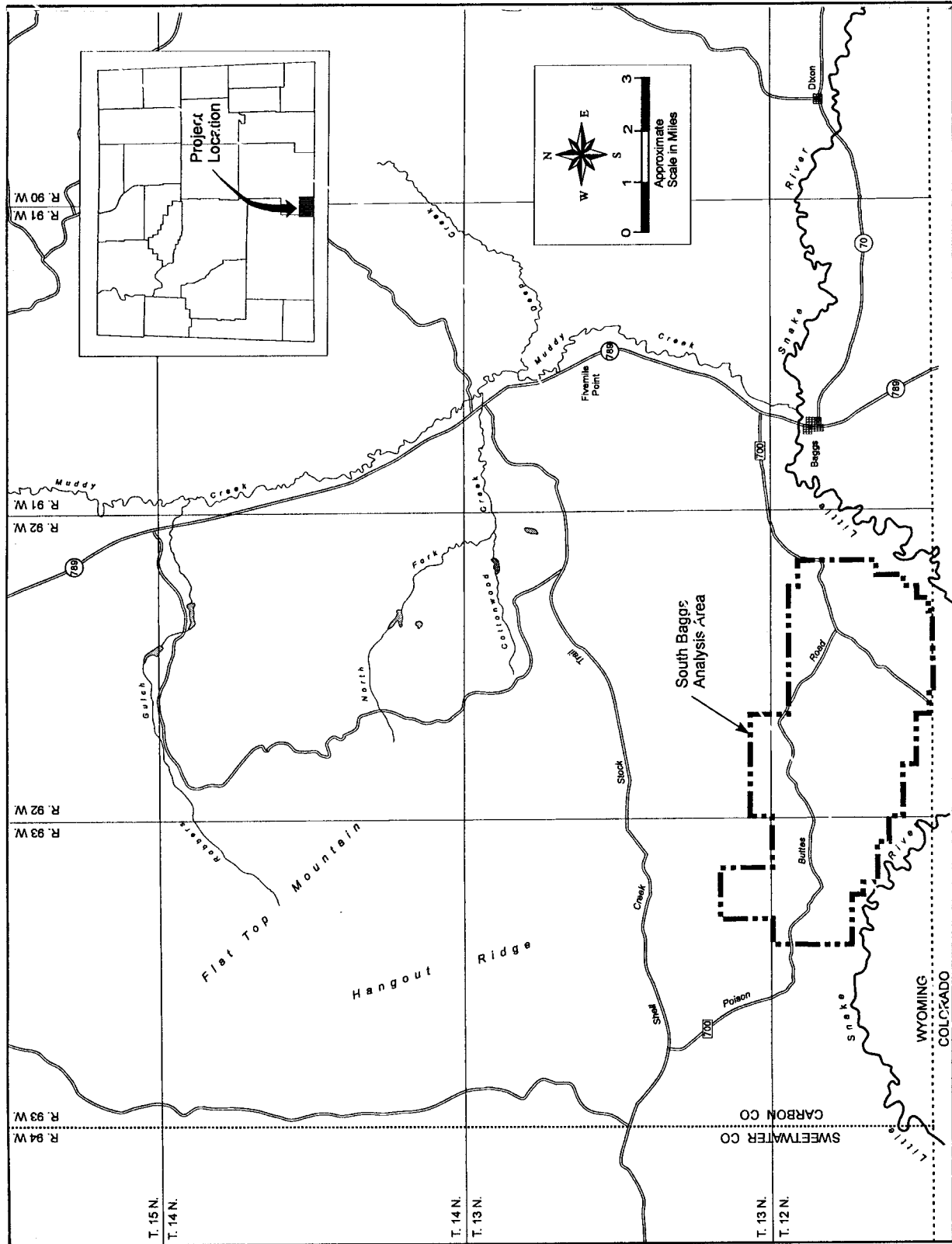


Figure 1-1. Area Map - Location of the South Baggs Analysis Area in Southcentral Wyoming.

RECORD OF DECISION

environmental harm resulting from the development and management in the South Baggs project area. The BLM also feels that the analyses demonstrate that the Proposed Action will meet the requirements of Federal Regulation 43 CFR 3162(a), which directs the Operators to conduct "...all operations in a manner which ensures the proper handling, measurement, disposition, and site security of leasehold production; which protects other natural resources and environmental quality; which protects life and property; and which results in maximum ultimate economic recovery of oil and gas with minimum waste and with minimum adverse effect on ultimate recovery of other mineral resources."

This decision applies only to the public land surface and federal mineral estate subject to administration by the BLM. All activities during the development, operation and production, and abandonment phases of the project will be conducted in compliance with all applicable federal, state and county laws, regulations, and stipulations. This decision is based on the Environmental Impact Statement (EIS) completed for the proposal. The EIS is guided by the BLM's RMP which describes the planning decisions for public land management within the Great Divide Resource Area. Comments received during the initial scoping period, the 60-day comment period for the DEIS, and the 30-day comment period for the FEIS were taken into consideration.

Approval of the Proposed Action and individual project components are subject to the administrative requirements and conditions of approval listed herein, as well as the applicable applicant-committed practices and the environmental standards, procedures, and requirements specified in Appendix A of this Record of Decision (ROD).

Approval of the Proposed Action and individual project components is conditioned upon and subject to the following pre-authorization administrative requirement: Before any permit is issued authorizing an action on public lands (i.e., Application for Permit to Drill, Sundry Notice, or Right-of-Way), the final location for each well site, access road, pipeline, or other facility will be evaluated site-specifically through categorical exclusion (CX), Documentation of Land Use Plan Conformance and NEPA Adequacy (DNA), or environmental assessment (EA) in accordance with the BLM National Environmental Policy Act Handbook (H-1790-1). In addition, the pre-authorization and/or administrative requirements contained in Appendix A, Section 1, of this ROD will apply to approval of the Proposed Action and individual project components.

The DEIS and the FEIS were made available for public review during the development of these two documents as well as provided to parties on the extensive DEIS and FEIS mailing lists. If following release of this ROD it becomes necessary to review either of these documents, copies may be obtained by contacting the Field Manager, Rawlins Field Office at the following address: BLM Field Manager, Rawlins Field Office, P.O. Box 2407, 1300 North Third Street, Rawlins, Wyoming 82301. A limited number of copies of the DEIS and FEIS remain available for distribution.

RECORD OF DECISION

APPROVED PROJECT COMPONENTS

This ROD provides the BLM Rawlins Field Manager approval to permit the following project components on public lands within the South Baggs project area. Development beyond the specified levels will require the preparation of a supplemental environmental impact analysis.

- 50 new natural gas well sites
- Access roads to well sites and facilities
- Gas gathering and transportation pipelines from producing wells
- Ancillary facilities associated with well production, and gas gathering and transportation

- **Wells**

The drilling, completion, testing, and producing of up to 50 additional natural gas wells represents all of the natural gas wells proposed for the South Baggs Project area. The 50 wells are in addition to approximately 43 wells that have already been drilled and developed or abandoned in the project area. The new well sites will involve disturbance of up to 162.5 acres.

- **Access Roads**

The construction and upgrading of access roads to well sites and facilities in the project area will involve disturbance of up to 80.0 acres.

- **Pipelines**

The construction and operation of natural gas gathering and transportation pipelines in the project area will involve disturbance of up to 50.0 acres. Gathering pipelines will be routed in a manner that best utilizes the existing topography in order to minimize surface disturbance.

- **Ancillary Facilities**

The construction and operation of one compressor facility will involve up to 1.4 acres of site disturbance.

SUMMARY OF THE SOUTH BAGGS NATURAL GAS DEVELOPMENT PROPOSED ACTION AND ALTERNATIVES

The South Baggs project area is located in Carbon County, Wyoming, as shown on Figure 1-1. The area is located on lands administered by the BLM Rawlins Field Office within Townships 12 and 13 North (T12-13N), Ranges 92 and 93 West (R92-93W), 6th Principal Meridian. The project area encompasses approximately 12,352 acres of mixed federal, State, and private lands. Of this total, approximately 10,067 acres are managed by the BLM and 2,285 acres are private lands.

RECORD OF DECISION

The Proposed Action will increase natural gas production in the South Baggs project area by allowing the operators to drill and develop approximately 50 natural gas wells in addition to existing operations within the project area. The Proposed Action was determined by summarizing drilling plans projected by the South Baggs operator, Merit Energy Company (Merit) over the next ten-year planning period. Total life expectancy of the South Baggs Natural Gas Production Area is estimated by Merit to be approximately 35 years. Drilling estimations were based on reasonably foreseeable spacing and drilling projections in areas within the project area where the planned production and development activities will occur, as well as development of related roads, pipelines, and production facilities.

The Proposed Action and three development alternatives were analyzed in the EIS. In addition, three other alternatives were considered but were not analyzed in detail in the EIS.

- **Proposed Action**

The Proposed Action will allow Merit to drill and develop 50 natural gas wells in the South Baggs Natural Gas Production Area over a period of approximately 10 years in addition to existing operations within the project area. Approximately 5 wells will be drilled within one year following project approval utilizing one drilling rig. Completion operations for these wells will commence as soon as the drilling rig moves off the drill pad. One completion rig will be utilized continuously for completion operations. The remaining wells will be drilled and completed with one drill rig throughout the remainder of the planned 10 year drilling period.

Construction of the Proposed Action will involve 50.0 acres of site disturbance resulting from pipeline construction (1.0 acre per well) (0.8 acre per well outside the access road right-of-way (ROW), 0.2 acre within the access road ROW where pipelines are located adjacent to existing access roads), 80.0 acres from access road construction (1.6 acres per well), and 162.5 acres from well sites (50 well sites with 3.25 acres of disturbance per site). A 1.4-acre compressor station will be constructed under all alternatives.

Impacts within the South Baggs project area will be reduced upon reclamation of pipeline ROWs and unused portions of the drill pads and roadway disturbances during the production phase for each alternative. Under the Proposed Action, reclamation will reduce impacts to 101.4 acres. This includes 70.0 acres for well pads (1.4 acre per pad) and 30.0 acres for roads (approximately 16.0 feet wide, or 0.6 acres per well), and 0.0 acres for pipelines. The compressor station will not be reclaimed since the full size of the site will be needed during production. The cumulative impact for the Proposed Action will be 211.4 acres (101.4 acres of disturbance remaining following reclamation plus 110.0 acres of existing unreclaimed disturbance) or 1.7 percent of the South Baggs project area.

- **Alternative A**

Alternative A represents a minimum level of additional site disturbance and will allow Merit to drill and develop approximately 40 new well sites with related facilities over the 10-year planning period. Development under Alternative A is in addition to the 43 wells that have been drilled and

RECORD OF DECISION

developed in the project area. The technical requirements for Alternative A, including the project-wide mitigation measures, are the same as described for the Proposed Action, however, less overall site disturbance will be necessary for the well sites, access roads, pipelines, and other ancillary facilities. Alternative A is the environmentally preferable alternative.

The construction of this alternative will involve 130.0 acres of drill site disturbance, 64.0 acres (1.6 acres per well) of road disturbance, 40.0 acres of pipeline disturbance, and 1.4 acres of compressor station disturbance, for a total of approximately 235.4 acres. A large portion of this area will be reclaimed as described under the Proposed Action. Alternative A impacts will decrease to 81.4 acres, with cumulative impacts affecting 191.4 acres or 1.5 percent of the South Baggs project area. The cumulative impact for Alternative A will be 191.4 acres (81.4 acres of disturbance remaining following reclamation plus 110.0 acres of existing unreclaimed disturbance) or 1.5 percent of the South Baggs project area.

- **Alternative B**

Alternative B provides a maximum development scenario of 90 wells, with related activities and facilities. The precise number of wells, locations of the wells, and timing of drilling will be directed by the success of development drilling and production technology, and economic considerations such as cost of development of leases having marginal profitability.

The technical requirements for Alternative B are the same as described for the Proposed Action and Alternative A; however more overall site disturbance will be necessary for the additional well sites, access roads, and pipelines.

The construction of this alternative will involve 292.5 acres of drill site disturbance, 144.0 acres (1.6 acres per well) of road disturbance, 90.0 acres of pipeline disturbance, and 1.4 acres of compressor station disturbance, for a total of approximately 527.9 acres. A large portion of this area will be reclaimed as described under the Proposed Action, thus reducing the total disturbance by 346.5 acres to 181.4 acres. The cumulative impact for Alternative B will be 291.4 acres (181.4 acres of disturbance remaining following reclamation plus 110.0 acres of existing unreclaimed disturbance) or 2.4 percent of the South Baggs project area.

- **Alternative C - No Action**

Alternative C, the "No Action" implies that on-going natural gas production activities will be allowed to continue by the BLM in the South Baggs project area, but the Proposed Action and Alternatives A and B will be disallowed. Additional APDs and ROW actions will be considered by the BLM for federal land on a case-by-case basis through individual project and site-specific environmental analysis. Transport of natural gas products will be allowed from those wells within the South Baggs project area that are currently productive. Additional gas development will occur on private lands within the project area under APDs approved by the WOGCC.

RECORD OF DECISION

- **Alternatives Considered But Eliminated From Detailed Analysis**

Because of existing limitations on well spacing within the project area, and rationale provided by Merit in Chapter 2, Section 2.5 of the DEIS, no additional alternatives were considered but eliminated from detailed analysis.

MANAGEMENT CONSIDERATIONS/RATIONALE FOR DECISIONS

My decision to approve the South Baggs Natural Gas Development Project Proposed Action takes into account important management considerations, Federal Agency missions, as well as the fact that natural gas is the U.S. Congress and President's energy of choice to comply with the Clean Air Act amendments of 1990, and helps meet the public need for cleaner burning, less polluting natural gas. The decision balances these considerations with the degree of adverse impact to the natural and physical environment. The development effort will help meet public needs for natural gas while at the same time allowing humans to coexist with nature in a way that results in the least degree of irreversible, irretrievable commitment of resources. The long-term productivity of the area will neither be lost, nor substantially reduced, as a result of approving the South Baggs Natural Gas Development Project.

My decision to approve the field development proposed action is based on careful consideration of a number of factors, including the following: 1) consistency with land use and resource management plans; 2) public involvement, scoping issues, and EIS comments; 3) relevant resource and economic considerations; 4) agency statutory requirements; 5) national policy; and 6) measures to avoid or minimize environmental harm.

1) Consistency with Land Use and Resource Management Plans - The decision to authorize the South Baggs Area Natural Gas Development Project Proposed Action is in conformance with the overall planning direction for the area. The Great Divide Resource Area RMP states that "Oil and gas exploration and development will be authorized in accordance with lease provisions. Lease constraints and development will be subject to land use decisions described in the Planning and Management Decisions section of the RMP Record of Decision."

2) Public Involvement, Scoping Issues, and EIS Comments - Opportunity for public involvement was provided throughout the environmental analysis process. The BLM published a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) in the Federal Register on January 23, 1996.

A Scoping Notice was prepared and submitted to the public by the BLM on February 1, 1996, requesting input into the proposed South Baggs Area Natural Gas Development project. Scoping documents were sent out to the public listed on the BLM mailing list, as well as organizations, groups, and individuals requesting a copy of the scoping document. The Scoping Notice explained the scope of the Merit Energy South Baggs natural gas development Proposed Action and requested comments concerning the level of analysis included in the DEIS.

RECORD OF DECISION

There were 29 written responses received during the scoping period in response to this project. These written responses consisted of 13 letters in favor of the drilling proposal and 16 letters that did not state a position in regard to the project but provided suggested mitigation if the project were implemented. There were no letters that specifically stated the project should not be implemented. The issues and concerns identified by the public during the scoping period are summarized in Chapter 1 of the DEIS.

The Environmental Protection Agency's Notice of Availability of the draft EIS was published in the *Federal Register* on May 21, 1999. Over 250 copies of the draft EIS were made available to the public and interested agencies for a 60-day public comment period. The date by which the comments had to be received was July 13, 1999. The public was invited to provide written comments on the draft EIS.

The Environmental Protection Agency's Notice of Availability of the final EIS was published in the *Federal Register* on April 14, 2000. Over 250 copies of the final EIS were made available to the public and interested agencies for a 30-day public comment period. The date by which the comments had to be received was May 21, 1999. The public was invited to provide written comments on the final EIS.

During preparation of the EIS, the BLM and the consultant interdisciplinary team (IDT) communicated with, and received or solicited input from various federal, State, county, and local agencies, elected representatives, environmental and citizens groups, industries, and individuals potentially concerned with issues regarding the proposed drilling action.

The BLM prepared a Biological Assessment (BA) of Threatened, Endangered, and Candidate Species for the South Baggs Area Natural Gas Development Project (May 2000) and consulted with the Department of Interior U.S. Fish and Wildlife Service. U.S. Fish and Wildlife Service management requirements for threatened and endangered and candidate species are documented in Appendix B of this Record of Decision. Specific mitigation requirements are included in Appendix A, Section II, Subsection 8.10 - Special Status Species (Special Status Animals, Avoidance and Mitigation, Items 7, 8, and 9).

The BLM consulted with the Wyoming Game and Fish Department on issues, impacts and mitigation for other wildlife populations and habitats; and consulted with the Department of Environmental Protection Agency, the U.S. Forest Service and Wyoming Department of Environmental Quality on issues, impacts and mitigation for air quality. The BLM has also consulted and coordinated with local, state, and county government officials. Native American Indian tribes were provided notices of the proposed project.

3) Relevant Resource Considerations - Some of the commentors on the Draft EIS and Final EIS raised similar concerns. The following areas of concern (a, b, and c below) summarize those most commonly expressed by commentors. A summary of each area of concern is followed by a discussion of BLM's consideration of the concern in the process of making its decision:

RECORD OF DECISION

a. The State of Wyoming Department of Environmental Quality - Air Quality Division (DEQ-AQD) raised concerns about possibly inappropriate use of SWWYTAF information and modeling in the South Baggs air quality impact analysis, and that the FEIS fails to acknowledge that many additional air quality meetings were conducted without all stakeholders (including the State of Wyoming) being present.

The South Baggs air quality impact analysis was performed independently of the SWWYTAF air quality study. While there may be a sharing of common data information between the two projects such as land use, terrain, meteorology, and certain source emissions, the two analyses were developed for completely different applications.

As stated in the FEIS (Section 5, page 5-22, Response 11-11), the Bureau chose to use an advisory stakeholder process when developing the CD\WII\SB Air Quality Impact Assessment Protocol (USDI-BLM 1998) describing the methodology the Bureau intended to use prior to conducting the air quality impact assessment. Although not required by NEPA, using an advisory stakeholder process to assist the Bureau in implementing its authority and responsibility to conduct air quality impact assessments is consistent with existing NEPA regulations. The sole purpose of the process was to enhance "cooperation before the environmental impact statement is prepared, rather than submission of adversarial comments on a completed document" consistent with NEPA regulations (40 CFR 1500.5). The advisory stakeholder process did not in any way alter the Bureau's authority and responsibility to conduct the air quality impact assessment consistent with existing NEPA regulations.

Prior to and during advisory stakeholder meetings, the Bureau emphasized that the team's purpose was to enhance cooperation before the Bureau conducted its air quality impact assessment, rather than to simply risk receiving adversarial comments on the DEIS. The Bureau also expressed a desire to obtain consensus, but insisted where consensus was not possible, the Bureau was solely responsible for conducting the assessment.

A technical air quality meeting was held at the office of one of the two air quality analysis contractor's (EarthTech) Massachusetts office in November, 1998 with the BLM, BP-Amoco (project proponent of the Continental Divide/Wamsutter II natural gas development project), TRC Environmental Corporation (the other air quality analysis contractor) and EarthTech. The purpose of the meeting was to review the preliminary CALPUFF modeling results for the Continental Divide/Wamsutter II/South Baggs projects, and to define a schedule for completion of the air quality analysis. There were no proprietary data used in the air analysis. The data used was defined in the final air analysis protocol, dated September 28, 1998.

The above comment and the BLM response did not modify the air quality analysis as presented in the EIS, therefore, the result of the analysis remains the same. Only minor decreases in air quality would occur as a result of authorization of the Proposed Action.

b. The State of Wyoming Game and Fish Department is concerned that the BLM, Rawlins Field Office has not adequately consulted with the Department nor adequately addressed all the Department's concerns about wildlife issues in the FEIS.

RECORD OF DECISION

The WGFD comment about inadequate consultation is similar to a comment received by the BLM on the DEIS. The WGFD comment 7-1 and our response 7-1 are found in the South Baggs Area FEIS. It is the hope of the BLM that frequent and open communication on the part of both agencies on future NEPA documents initiated by this office will result in an environmental analysis process that provides the public with sufficient information to understand the impacts of the action and provides the authorized officer with the best information available with which to make an informed decision.

The WGFD repeated their earlier concern that the BLM identify a maximum level of additional impacts that would trigger a supplemental EIS. As stated in our response to comment 7-2 in the FEIS, if the operator should propose to drill additional wells that would exceed the level of activity authorized under this ROD or exceed the disturbance analyzed in the EIS, then the 90 well alternative analyzed in the EIS could be reviewed to determine if additional development could occur under a new ROD or if a new environmental analysis was required.

The WGFD asserted that the BLM response to comment 7-3 of the DEIS did not adequately address their comment. The WGFD comment raised the concern that the Great Divide Resource Management Plan (RMP) called for protection of crucial winter range for big game species. The WGFD interpreted this to mean that "development could only occur if winter range is protected". The statement in the RMP does not state that every acre of winter range must be preserved. The implication is that the integrity of the winter range must be maintained and that mitigation measures should be applied that will reduce the negative impacts of development and eventually restore the function of the disturbed habitat.

The WGFD has questioned some of the data used in the analysis of impacts to big game. The estimate used in the analysis was provided to the BLM by the WGFD district biologist who estimated that the number of deer using the area during a hard winter could be three times the figure counted during partial counts of the area (305). Average density calculations were made using this WGFD information; 915 deer within the analysis area during a hard winter. From information provided in the WGFD comment it is evident they believe the 915 deer figure used in the revised analysis would only account for the number of deer that would have been counted during the ground survey if the entire project area had been accessible during the winter counts. The WGFD suggests that the partial count figures were not inflated to account for deer that are normally missed during aerial or ground surveys. Research suggests up to 44-50% of the deer are missed during helicopter surveys (Ackerman 1988, Bartmann et al. 1986) and the number of deer missed during ground surveys can be larger. It is the position of the BLM that even if the 915 deer figure was doubled to account for deer missed during the survey, the new estimates would not substantially change the analysis. The overall analysis still concluded that the Proposed Action will only result in the post-reclamation long-term disturbance of 99.4 acres of Mule Deer Crucial Winter Range within the 12,352 acre project area and that habitat function will not be substantially reduced. However, in order to help minimize reduction of habitat function and the potential effects of construction activities on the migration movements of mule deer through Poison Basin, two mitigation items are included in Appendix A, Section II (Applicable Applicant-Committed Construction, Operation, and Resource Protection Practices, and Applicable EIS-Identified Mitigation and Monitoring Measures), Sub-section 8.9, Wildlife, Items 10 and 11.

RECORD OF DECISION

The above comment and the BLM response did not substantially modify the big game analysis as presented in the EIS, therefore, the result of the analysis remains the same. Only minor decreases in winter range and minor disturbance to wildlife would occur as a result of authorization of the Proposed Action.

c. The Wyoming State Geological Survey (WSGS) is concerned that radioactive and selenium risks to gas field personnel were not adequately addressed in the EIS.

The WSGS requested that if any of the gas wells drilled in the South Baggs Area encounter gamma anomalies, that the WSGS be notified. Uranium deposits in the area are relatively shallow and it is not standard operating procedure for gas companies to run well logs on these shallow formations that are normally surface cased. Well logs that are run on deeper formations are provided to the BLM and to the Wyoming Oil and Gas Conservation Commission (WOGCC). Where well log information is not requested to be held as confidential data by the operator, well log gamma anomaly data could be obtained from the WOGCC.

Merit Energy is aware of the uranium and selenium mineralization in the project area. Uranium is a known health hazard where the concentrations are high or exposure is prolonged. The unusually high content of selenium (Beath, and others, 1946, p. 13) may constitute a health hazard if selenium dust is inhaled. Merit Energy will take steps necessary to ensure employee safety according to State and federal safety and health requirements. It is our belief that through proper safety procedures identified and required by the State of Wyoming at the APD stage that exposures to uranium and selenium will be negligible. In addition, the company has committed to use appropriate dust abatement methods in areas identified by the BLM or WDEQ-AQD.

The above comment and the BLM response hopefully clarified the discussion of presence of uranium and selenium within the project area and the minimal risk from these sources presented in the EIS, therefore, the result of the analysis remains the same. Only negligible increases in health risk would occur as a result of authorization of the Proposed Action. The primary responsibility for compliance with state and federal laws and regulations pertaining to employee safety remains with the State of Wyoming.

Literature Cited: Beath, O. A., Hagner, A. F., and Gilbert C. S., 1946, Some rocks and soils of high selenium content: The Geological Survey of Wyoming, Bull. 36.

4) Agency Statutory Requirements - The decision is consistent with all federal, state, and county authorizing actions required to implement the Operator's proposed action (see DEIS Table 1-3.) All pertinent statutory requirements applicable to this proposal were considered. These include consultation with the FWS regarding threatened, endangered, and candidate species; consultation with the Army Corp of Engineers (ACOE); coordination with the State of Wyoming regarding wildlife, environmental quality, and oil and gas conservation; and Carbon County Commissioners for coordination of construction and use permits.

5) National Policy - Private exploration and development of federal oil and gas leases is an integral part of the BLM oil and gas leasing program under authority of the Mineral Leasing Act of

RECORD OF DECISION

1920 and the Federal Land Policy and Management Act of 1976. The United States continues to rely heavily on foreign energy sources. The oil and gas leasing is needed to encourage development of domestic oil and gas reserves to reduce the United States' dependence on foreign energy supplies. Also, natural gas is the "energy-of-choice" by the Congress and President because it is clean burning and less polluting. Therefore, the decision is consistent with national policy.

6) Measures To Avoid or Minimize Environmental Harm - The adoption of the mitigation measures identified in the South Baggs Draft and Final EIS and contained in this decision represent all practicable means to avoid or minimize environmental harm. To ensure that the environmental consequences of the field development activities will be minimal, not only are the required environmental safeguards and resource protection measures prescribed by the Great Divide Resource Area RMP incorporated in the EIS, but additional protection measures have been incorporated from public, local, state, and other federal agency input. With implementation of the committed mitigation and the standard operating procedures for surface-disturbing activities, no substantive issues remain unresolved as raised by governmental agencies, industry, or individuals.

COMPLIANCE AND MONITORING

Because of the importance of mitigation for avoiding or minimizing adverse impacts, a monitoring program shall be implemented by the South Baggs operator, Merit Energy. Guidelines for monitoring will be developed by the operators in cooperation with BLM, and other state and federal agencies as appropriate, in accordance with this decision. Merit Energy or their contractor, will conduct monitoring in accordance with the provisions of this decision. Merit Energy and the BLM will provide qualified representatives on the ground during and following construction to validate construction, reclamation, other approved design, and compliance commensurate with the provision of this decision.

Appropriate remedial action will be taken by Merit Energy within the South Baggs project area in the event unacceptable impacts are identified. Merit Energy will be required to conduct monitoring of project sites in cooperation with the BLM. Plans submitted by Merit Energy or their contractor, and with each APD, ROW, or appropriate permit application, will include monitoring provisions for the following: Road construction to approved standards, reclamation success, review of wildlife use and/or changes in use including listed or candidate species, or any threatened, endangered, or migratory bird species or their habitat in the area (including raptor nests), big game use, and sage grouse. The reclamation monitoring program shall include written documentation for the effectiveness and success of reclamation mitigation. Merit Energy will monitor its reclamation to ensure that revegetation meets the accepted standards prescribed in the ROD.

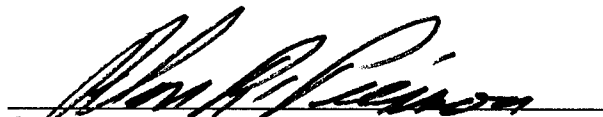
RECORD OF DECISION

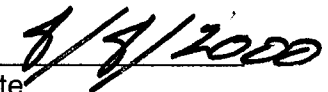
The EIS prepared on the South Baggs Natural Gas Development proposal will guide implementation of the natural gas development; however, it is not the final environmental review upon which approval of all actions in the area will be based. Site specific evaluations will be required for each well and associated access roads, pipelines, and other actions in accordance with the BLM National Environmental Policy Act Handbook (H-1790-1). This provision for site specific evaluation of environmental protection needs will ensure that there is optimum consideration given to resource protection.

APPEAL

This decision may be appealed to the Interior Board of Land Appeals, Office of the Secretary, in accordance with the regulations contained in 43 CFR 3165.4(c). If an appeal is filed, the notice of appeal must be filed in this office (Bureau of Land Management, State Director, P.O. Box 1829, Cheyenne, Wyoming 82003) within 30 days of the date the notice of the decision appears in the *Casper Star Tribune*. The appellant has the burden of showing that the decision appealed from is in error.

If you wish to file a petition (pursuant to 43 CFR 3165.4© for a stay (suspension) of the effectiveness of this decision during the time that your appeal is being reviewed by the Board, the petition for a stay must accompany your notice of appeal. A petition for a stay is required to show sufficient justification based on the standards listed in 43 CFR 3165.4(c). Copies of the notice of appeal and petition for a stay must also be submitted to the Interior Board of Land Appeals and to the appropriate office of the Solicitor at the same time the original documents are filed with this office. If you request a stay, you have the burden of proof to demonstrate that a stay should be granted.


State Director


Date

APPENDIX A

ENVIRONMENTAL STANDARDS, PROCEDURES, AND REQUIREMENTS FOR IMPLEMENTATION OF THE SOUTH BAGGS AREA NATURAL GAS DEVELOPMENT PROJECT

APPENDIX A

Table of Contents

Section 1 General Pre-Authorization And/Or Other Administrative Requirements

Authorization to Proceed	Page A-2
--------------------------	-------------

Section II Applicable Applicant-Committed Construction, Operation, and Resource Protection Practices, and Applicable EIS-Identified Mitigation and Monitoring Measures

1.0	Preconstruction Planning and Site Layout	A-4
2.0	Construction and Drilling Phase	A-5
2.1	Well Pad Design and Construction	A-5
2.2	Access Road Construction	A-7
2.3	Pipeline Construction	A-8
2.4	Drilling Operations	A-9
3.0	Completion and Testing Operations	A-10
4.0	Production Operations	A-11
5.0	Ancillary Facilities	A-12
6.0	Geophysical Operations	A-12
7.0	Site Restoration and Abandonment	A-12
8.0	Project-Wide Mitigation Measures	A-12
8.1	Range Resources and Other Land Uses	A-13
8.2	Air Quality	A-13
8.3	Transportation	A-13
8.4	Minerals/Paleontology	A-14
8.5	Soils	A-14
8.6	Water Resources	A-15
8.7	Fisheries	A-17
8.8	Vegetation and Wetlands	A-17
8.9	Wildlife	A-17
8.10	Special Status Species	A-18
8.11	Visual Resources	A-20

		Page
	8.12 Noise	A-21
	8.13 Recreation	A-21
	8.14 Socioeconomics	A-21
	8.15 Cultural Resources	A-21
	8.16 Health and Safety	A-21
9.0	Monitoring	A-23
	9.1 Geology/Minerals/Paleontology	A-23
	9.2 Soils	A-23
	9.3 Water Resources	A-23
	9.4 Vegetation and Wetlands	A-24
	9.5 Wildlife	A-24
	9.6 Special Status Species	A-24
	9.7 Cultural Resources	A-24
	9.8 Transportation	A-25
	9.9 Health and Safety	A-25

Section III **Reclamation Guidelines**

1.0	Introduction	A-26
2.0	Objectives	A-28
3.0	Performance Standards	A-29
4.0	Methods	A-29
	4.1 Drill Site, Access Road, and Pipeline Clearing and Topsoil Removal and Storage	A-29
	4.2 Drill Site, Access Road, and Pipeline Right-of-Way Construction	A-30
	4.3 Surface Runoff and Erosion Control	A-32
	4.4 Final Reclamation	A-35
	4.5 Monitoring and Maintenance	A-43

Section IV **Hazardous Materials Management Plan**

1.0	Introduction	A-45
2.0	Hazardous Materials	A-46
2.1	Production Products	A-46
2.2	Construction, Drilling, Production, and Reclamation	A-48
2.3	Combustion Emissions	A-55
3.0	Management Policy and Procedure	A-57

Appendix A Figures and Tables

Figure A-1	Water Bar Construction and Silt Fence Construction	Page A-34
Table A-1	Water Bar Intervals According to Slope Gradient	A-35
Table A-2	Seed Mixture #1 - Mixed Desert Shrub, Badlands, and Juniper Woodland Community Types	A-38
Table A-3	Seed Mixture #2 - Moist Alkaline Areas in the Mixed Desert Shrub Community Type	A-39
Table A-4	Seed Mixture #3 - Greasewood-Dominated Valley Bottoms And Bluffs	A-40
Table A-5	Seed Mixture #4 - Wet Meadow Community Types	A-41
Table A-6	Hazardous and Extremely Hazardous Materials Potentially Produced by the South Baggs Area Natural Gas Project, Carbon County, Wyoming, 1996	A-47
Table A-7	Hazardous and Extremely Hazardous Materials Potentially Utilized During Construction, Drilling, Production, and Reclamation Operations by the South Baggs Natural Gas Project, Carbon County, Wyoming, 1998	A-50
Table A-8	Hazardous and Extremely Hazardous Materials Potentially Present in Combustion Emissions of the South Baggs Natural Gas Project, Carbon and County, Wyoming, 1996.	A-56
Table A-9	Generic List of Hazardous Chemical Categories for the Oil and Gas Exploration and Production Industry.	A-58

APPENDIX A

ENVIRONMENTAL STANDARDS, PROCEDURES AND REQUIREMENTS FOR IMPLEMENTATION OF THE SOUTH BAGGS AREA NATURAL GAS DEVELOPMENT PROJECT

This Appendix is divided into four sections as follows:

- Section I: General Pre-Authorization and/or Other Administrative Requirements
- Section II: Applicable Applicant-Committed Construction, Operation, and Resource Protection Practices, and Applicable EIS-Identified Mitigation and Monitoring Measures
- Section III: Reclamation Guidelines
- Section IV: Hazardous Materials Management Plan

Section I: General Pre-Authorization and/or Other Administrative Requirements

Merit Energy and their contractors and subcontractors will conduct operations in full compliance with applicable Federal, State, and local laws and regulations, and within the guidelines/stipulations specified in the Decision Record, ROW grants, and permits issued by BLM.

The standards, procedures and requirements described in this Appendix are taken from BLM State and Field Office standards and the Great Divide Resource Management Plan (RMP). Permit applications refer to APDs, Sundry Notices, ROW applications, and other required BLM applications.

The Standard Operating Procedures for Surface-disturbing Activities must be adhered to during all activities unless an Authorized Officer (AO)-approved written exception has been granted. Exceptions will only be granted in cases where adherence to standard procedures is not possible or necessary, and the project is acceptable with proper mitigation.

In accordance with BLM regulation 43 CFR 3162.1(a) and Onshore Orders, Merit Energy will be responsible for the compliance of its employees, contractors, and subcontractors with the terms and conditions of all permits, agreements, and mitigation measures described in this Decision Record. Each contractor and subcontractor will be required to maintain up-to-date plans and specifications at construction sites.

Merit Energy will keep livestock operators and land owners informed of construction activities. During construction, the operators will require their contractors to regulate access and vehicular traffic as necessary to protect the public and livestock from hazards associated with construction. The operators will conduct all activities in compliance with the terms and conditions of the *South Baggs Natural Gas Development Project Record of Decision* and all applicable Federal, State, and local regulations. The operators will implement all mitigation measures developed in conjunction with the South Baggs EIS brought forward into the ROD and this Appendix.

All phases of the project including well location, road and pipeline construction, drilling and completion operations, maintenance, and reclamation will be conducted by Merit Energy and their subcontractors in full compliance with all applicable federal, state, and local laws and regulations and within the guidelines specified in approved APDs, ROW permits, and site-specific

APPENDIX A

evaluations and Decision Records (i.e., individual well location, road, pipeline, and ancillary facility evaluations).

Merit Energy will comply with existing federal, state, and county requirements and restrictions developed to protect road networks and the traveling public. Special arrangements will be made with the Wyoming Highway Department, as required, to transport oversize loads to the project area. Otherwise, load limits will be observed at all times to prevent damage to existing road surfaces.

Authorization to Proceed

The Rawlins Field Office Manager will be the AO for the project. Mitigation and monitoring measures identified in this appendix may be modified by the AO based on new information or to further minimize impacts. Interdisciplinary team recommendations will be developed during field site analyses, conducted during APD and ROW reviews, and presented to the AO. Final mitigation and monitoring requirements will be determined by the AO.

Site-specific plans/reports (e.g., road and well design plans; erosion control and revegetation plans; cultural clearance; special status plant species clearance; etc.) will be developed by Merit Energy as appropriate and submitted with each APD, ROW application, or Sundry Notice. Concurrent interdisciplinary team on-site evaluations will also be conducted.

Approval of individual project components (i.e., wells, roads, pipelines, and ancillary facilities) for the project area will be contingent upon completion of a site-specific cultural resource file search and Class III cultural clearance, paleontological clearance, T&E and candidate species surveys, site-specific CX/DNA/EA, and Decision Records for each well, road, pipeline, or other facility unless otherwise provided by the AO.

Prior to constructing a project component, Merit Energy will prepare an APD, ROW, or appropriate permit application which will define and map specific locations where site-specific mitigation and environmental protection measures called for in this Appendix will be implemented. Final locations for these measures will be confirmed by BLM and Merit following on-site inspections of project locations. Individual APDs, ROW, or permit applications will discuss configuration of the reshaped topography, drainage systems, segregation of spoil materials, surface manipulations, waste disposal, and soil treatments. An estimated time for commencement and completion of reclamation operations will also be included.

The APD, ROW, or permit application will include maps and diagrams showing the following information, as applicable:

- Pipeline alignments relative to existing and proposed roads;
- Well pad locations relative to existing pads and roads;
- Well pad designs;
- Roads that will be used to access the project area;
- Proposed road designs;
- Any temporary use areas or road pullouts;

APPENDIX A

- Areas with special terrain conditions (e.g, steep slopes);
- Other areas with special conditions such as proximity to drainages or cultural resources;
- Specific locations where mitigation measures will be implemented (e.g., mulching, waterbars);
- Crossings of intermittent drainages;
- Areas of grading and stripped vegetation;
- Topsoil stockpiles;
- Sediment control measures; and,
- Location of crucial habitats, and other resources which could result in seasonal constraints on proposed activities;
- Production Facilities Diagram.

APPENDIX A

SECTION II:

APPLICABLE APPLICANT-COMMITTED CONSTRUCTION, OPERATION, AND RESOURCE PROTECTION PRACTICES, AND APPLICABLE EIS-IDENTIFIED MITIGATION AND MONITORING MEASURES

The following lists the applicable construction, operation, reclamation, abandonment practices, and project-wide mitigation measures that Merit Energy committed to implement during the development of their project, as described in the Proposed Action section of Chapter 2 of the *South Baggs Area Natural Gas Development Project* DEIS, and Section 2 of the FEIS. Operator-committed practices or measures from Chapter 2 of the DEIS not consistent with accepted standards, or that were changed as a result of the EIS, are not listed.

The *South Baggs Area Natural Gas Development Project Draft and Final EISs* identified additional mitigation opportunities in Chapters 4 and 5 of the DEIS and Section 2 of the FEIS to reduce impacts on certain resources. Those measures considered reasonable for Merit Energy and/or BLM implementation are brought forward from the EIS into this section, and are listed as additional measures or measures replacing inadequate operator measures. Some measures are not within the administrative authority of the BLM to require and are therefore identified as measures Merit Energy "could" or "should" implement.

The following environmental protection practices, standards, procedures and requirements specified in the three sections in Appendix A will be incorporated into the development of the project area through the permitting process (Application for Permit to Drill (APD), Right-of-Way (ROW), or other permit) as appropriate for each proposed well, access road, pipeline, central facility, etc.

1.0 PRECONSTRUCTION PLANNING AND SITE LAYOUT

Merit will follow the procedures outlined below to gain approval for the proposed development activities on BLM administered lands within the South Baggs project area. Development activities proposed on fee (private) land will be approved by the Wyoming Oil and Gas Conservation Commission (WOGCC). The WOGCC permitting procedures require filing an APD with the WOGCC and obtaining a ROW from the surface owner.

- Prior to the start of construction activities, Merit will submit an APD/Sundry Notice/ROW Application to the BLM with a map showing the specific location of the proposed activity (e.g., individual drill sites, pipeline corridors, access roads, or other facilities). The application will include site-specific plans where necessary to describe the proposed development (i.e., Drilling Plans with casing/cementing program; surface use plans with road and drill pad construction details; and site specific reclamation plans, etc.). Approval of all planned operations will be obtained in accordance with authority prescribed in Onshore Oil and Gas Order No. 1 (Approval of Operations on Onshore Federal and Indian Oil and Gas Leases).

APPENDIX A

- The proposed facility will be staked by the applicant and inspected by an interdisciplinary team and/or an official from the BLM to ensure consistency with the approved Great Divide Resource Area RMP, approved mitigation measures incorporated into the South Baggs Area Record of Decision (ROD), and plans provided by Merit in the APD/Sundry Notice/ROW Application.
- More detailed construction plans, when required by the BLM for the proposed development, will be submitted to the BLM by Merit. The plans will address concerns that may exist with regard to construction standards, required mitigation, etc. Negotiation of these plans between Merit and the BLM, if necessary to resolve differences, will be based on field inspection findings and will take place either during or after the BLM on-site inspection.
- Merit and/or its contractors will revise the APD/Sundry Notice/ROW Application as necessary per negotiations with the BLM. The BLM will complete a project-specific environmental analysis that incorporates agreed upon construction and mitigation standards. The BLM will then approve the specific proposal and attach the Conditions of Approval to the permit. Merit must then commence with the proposed activity within one year.

2.0 CONSTRUCTION AND DRILLING PHASE

2.1 Well Pad Design and Construction

As discussed in the DEIS, Section 2.1.2.1, the traditional single-well pad design has been utilized in the South Baggs area in the past and will continue to be the drill site design utilized under the Proposed Action. (See DEIS, Section 2.5, Alternatives Considered But Not Analyzed in Detail, for rationale used in selection of the single well pad design). The traditional well pad will be constructed from native materials located at the site. Drilling activity under the Proposed Action is planned in the Wasatch Formation and the Mesaverde/Lewis Formations. Due to differences in planned drilling depths, the well pad size for the Mesaverde/Lewis Formations is larger than for the Wasatch Formation (DEIS Figures 2-1 and 2-2). Pad size for Mesaverde or Lewis wells is estimated to be 350 ft. x 400 ft, and the pad size for Wasatch wells is estimated to be 270 ft. x 325 ft. Under the approved action (Operator's Proposed Action), 25 Wasatch Formation and 25 Mesaverde/Lewis Formation wells are planned to be drilled during the planned 10-year drilling period. The actual well pad size will depend on terrain limitations existing at the site. The well pad will be designed so that construction materials balance (i.e., soil materials taken from cuts will be about the same quantity as that needed for fill to construct a level pad), while attempting to minimize the total disturbed area.

Projected disturbance for the 50 new well sites, using the average pad size (302 feet x 355 feet) for both Wasatch and Mesaverde/Lewis Formations will be 125 acres. Following partial reclamation of all productive well sites, the remaining site disturbance (250 feet x 250 feet per well) during the life of the project will be 70 acres.

All available topsoil suitable for reclamation (up to 12 inches) will be stripped from the well pad area and stored adjacent to the well pad. This storage site is to be designated on the well pad design

APPENDIX A

plan in the APD prior to start of actual well pad construction. Cut and fill slopes will be designed, if deemed necessary, in a manner that will hold topsoil during reclamation and subsequent re-establishment of vegetation. Well pad construction and related facilities will usually require approximately 4 to 6 days to complete, depending on site and terrain limitations.

After topsoil stripping operations are complete, construction of the well pad will begin. Construction practices will involve use of standard earthmoving equipment.

Components of the well pad include construction of a reserve pit to temporarily store drilling fluids, cuttings, and water produced during drilling, and a flare pit for emergency and development flaring. DEIS Figures 2-1 and 2-2 show the approximate layout of the drill pad and drilling-related facilities for the Wasatch Formation and the Mesaverde/Lewis Formations.

In non-critical areas and when a fresh water based mud system is being used, Merit proposes to use an unlined earthen reserve pit. Earthen reserve pits will be used only after evaluation of the pit location for distance to surface waters, depth to useable ground water, soil type and permeability, and after evaluation of the fluids which will likely be retained in the pit. If deemed necessary during the individual well site APD review, the reserve pit will be lined with an impermeable liner to prevent seepage. Bentonite or impermeable lining will be used where appropriate as defined during APD review. The synthetic liner will be at least 12 mils (12,000ths of an inch) thick, reinforced with a bursting strength of 174 x 175 pounds per inch (ASTMD 75719), resistant to decay from sunlight and hydrocarbons, and compatible with the drilling fluids to be retained.

All reserve pits will be fenced with sheep tight wire on 3 sides immediately following construction. The fencing will remain in place as long as drilling operations were ongoing. The fourth side of the reserve pit will be fenced at the time the rig substructure is moved from the drill site location to minimize the potential for loss of wildlife and domestic animals. Also, reserve pit fluids will be allowed to dry by evaporation for approximately one year prior to reserve pit closure and drill site reclamation. If drilling fluids remain in the pit after one year, alternate methods of drying, removal of the fluids, or other treatment measures will be determined by Merit in consultation with the BLM. Necessary permits will be acquired by Merit if fluids are transported off-site for disposal.

Site erosion and off-site sedimentation will be controlled by Merit providing surface water drainage controls, such as berms, sediment collection traps, diversion ditches and erosion stops immediately after construction, and promptly revegetating sites in the first appropriate season (fall or spring) after drilling. These measures will be described in the individual APD/ROW.

Service trailers located on the well pad will be self-contained and will not require a septic system. Sewage will be hauled off-site to a State Department of Environmental Quality (DEQ) approved disposal site.

In the event drilling is non-productive, all disturbed areas, including the well site and new access road, will be reclaimed to the approximate landform that existed prior to construction. Reclamation and site stabilization techniques will be applied as specified in the APD Surface Use Plan or the Right-of-Way Plan of Development (POD). Guidelines for reclaiming disturbed areas associated with drill site, access road, pipeline, and facility construction are shown in Section III.

APPENDIX A

If drilling is productive, all access roads to the well site will remain in place for well servicing activities (i.e., maintenance, improvements, etc.). Partial reclamation will be completed on segments of the well pad and access road ROW no longer needed.

2.2 Access Road Construction

The primary road access utilized by Merit to access the South Baggs project area is Carbon County Road 700 (Poison Buttes Road), which accesses the project area from Wyoming State Highway 789 (Figure 1-2). Additional access is provided to the interior of the South Baggs area by existing BLM resource roads developed to service other natural gas development and land use activities. The road network within the South Baggs project area is discussed in detail in DEIS Chapter 3, Affected Environment. BLM Manual Section 9113 road classifications categorize South Baggs area roads into three separate classes:

1. Collector Roads - These roads normally provide primary access to large blocks of land and connect with or are extensions of a public road system. Collector roads are two-lane and require application of the highest road standards. The design speed is 30-50 mph and the subgrade width is a minimum of 24 feet (20 feet full-surfaced travelway).
2. Local Roads - These are low volume roads providing the internal access network within an oil/gas field. The design speed is 20-50 mph and the subgrade width is normally 24 feet (20 feet full-surfaced travelway). Low volume roads in mountainous terrain may be single-lane roads with turnouts.
3. Resource Roads - These are normally spur roads that provide point access. Roads servicing individual oil/gas exploration and production locations fall within this classification. The road has a design speed of 15-30 mph and is constructed to a minimum subgrade of 16 feet (12 feet minimum full-surfaced travelway) with intervisible turnouts.

Merit will construct access roads across public lands in accordance with BLM Manual 9113 standards. Roads located on private lands will be constructed in accordance with standards imposed by the private land owner. Roads will be located to minimize disturbances and maximize transportation efficiency. The number of roads will be limited to decrease potential impacts by discouraging development of looped roads and by accessing wells from short resource roads off the local roads. All new access roads will be constructed for the specific purposes of natural gas field development. Roads will be closed and reclaimed by Merit when they are no longer required for production operations, unless otherwise directed by the BLM.

Merit estimates that each new well will require an average of 1/3 mile of road and 1/3 mile of pipeline (pipeline to the new well sites will be constructed along the roadway where possible as shown on DEIS Figure 2-4). Of this, approximately one-half of the pipeline length (1/6 mile) will be adjacent to new roads. Road and pipeline disturbance will be approximately 50 feet in width. Construction of new roads and pipelines combined is estimated at 90 acres (1.8 acres per well x 50 wells = 90 acres).

APPENDIX A

Roads will be designed to minimize disturbance and will be built and maintained as specified by the BLM to provide safe operating conditions at all times. Surface disturbance will be contained within the road ROW and will average 40 feet for resource roads.

Construction equipment and techniques utilized by Merit will be standard (e.g., crown-and-ditch method). A typical roadway cross section with width specifications for use in the South Baggs project area is shown in DEIS Figure 2-5. Where identified during on-site review by the BLM, resource roads to well sites will be constructed and graveled prior to start of drilling operations. Surfacing and base course materials will be obtained from existing, operational gravel pits located on private sources near the project area. Roads will be built and maintained to provide year-round access. Respreading of topsoil and windrowed vegetation to the sideslopes of the newly constructed access roads and revegetation will begin the first fall following the well going on production. The resource road to an unproductive well site will be reclaimed upon abandonment of the well using stockpiled topsoil and a seed mixture contained in the Reclamation Recommendations (Section III). Reclamation measures will be implemented the first operating season after well abandonment.

2.3 Pipeline Construction

New gas gathering lines will be constructed to facilitate transportation of produced natural gas. Gas will be gathered from each producing well by means of a 4 to 6-inch diameter gathering line. Size of the gathering line will be dependent on the amount of production at each well site. Estimated length of gathering lines from the wells to the gas transportation lines is 1/3 mile per well. As discussed in DEIS Section 2.1.2.2, approximately 1/6 mile of new pipeline will not be located within an access road corridor. New disturbance associated with pipeline construction, 40 feet in width, will be 40 acres (0.8 acres per well).

The gathering lines will be constructed in the resource road corridors as shown in DEIS Figure 2-4 to each well except where limited by topographic features. A typical schematic of pipeline installation alongside a road is illustrated in DEIS Figure 2-6.

The actual pipeline location will be surveyed and staked prior to the start of any construction activities. The pipeline company installing the pipeline will submit a Plan of Development (POD), including design plans, to the BLM that describes planned construction procedures and techniques along the pipeline corridor. In order to minimize the total amount of surface disturbance, the pipeline corridor will not be cleared of heavy brush prior to any activities. This determination will be made by the BLM AO prior to construction and will consider factors such as construction crew safety concerns, sideslopes, and brush density. Stripping of topsoil from the pipeline corridor will not be approved. Pipeline construction will occur in a planned sequence of operations common to natural gas pipeline installation specifications and will take place along a corridor of continuous activity. All pipeline installation work will be completed by a contractor working under the supervision of the pipeline company. Construction activities will be confined to the 40-foot ROW.

The pipeline trench will be excavated mechanically with trenching equipment such as a backhoe or trencher. The width of the trench will be approximately 24 inches. The trench will be constructed to a minimum depth of 5 feet.

APPENDIX A

Pipe laying activities will include pipe stringing, bending, welding, coating, lowering of pipeline sections, and backfilling. Subsoil will be backfilled and compacted into the trench over the pipe. Site regrading will occur where necessary. Reclamation of the pipeline route will occur as authorized by the BLM ROW Grant. The newly-constructed pipelines will be tested to prove structural soundness. The method used will be hydrostatic testing, and will be in full compliance with the mandatory BLM ROW stipulation for hydrostatic testing. Hydrostatic testing consists of filling the pipeline with water, pressuring the pipeline to the designated test pressure, and maintaining that pressure at 1.5 times the maximum allowable operating pressure for a specified period of time. If any rupture or leaks occur, they will be located and repaired and the test process repeated until completely successful. The line will then be de-watered and dried to prepare it for final tie-in to the gas gathering system. Approximately 2,700 gallons of water are required to hydrostatically test one mile of four-inch pipeline. With an estimated 16.5 miles of new pipeline needed to connect the gas wells with the transportation system, approximately 44,550 gallons of water will be needed to test the new pipeline segments, assuming an average of 4-inch diameter pipe.

Necessary water appropriation permits will be obtained from the Wyoming State Engineer's Office. Water will be taken from local water sources near the project area. After testing operations are completed, the water will be pumped into water hauling trucks and transported to drilling locations within the project area to be used in conjunction with the drilling operations. If not needed for drilling operations, the test water will be disposed of onto undisturbed land having vegetative cover or into an established drainage channel in a manner as not to cause accelerated erosion.

Water produced from drilling activities could also be used to hydrostatically test new pipeline. Produced water used for testing will subsequently be disposed of in a manner approved by the BLM in the POD or ROW application.

2.4 Drilling Operations

Each drilling operation will require transport of approximately 25 truckloads of drilling-related equipment and materials to facilitate the drilling operation. This number includes transportation of the drill rig, drill pipe, drilling fluid products, and related support equipment, but does not include the truck traffic required for resupplying the operation (e.g., fuel). Additional traffic will be variable, depending on the phases of the drilling operation, but should not include more than two or three vehicles per day per drill site throughout the drilling operation. Total rig-up activities and installation of ancillary facilities will take approximately 3 days to complete.

Merit proposes to drill 50 wells over a period of approximately 10 years. Approximately 5 wells will be drilled the first year utilizing one drill rig. Completion operations for these wells will commence as soon as the drilling rig moves off location. The remaining wells will be drilled and completed with a single drill rig throughout the remainder of the planned 10-year drilling period.

The geologic formations to be tested by Merit in the South Baggs project area are the Mesaverde/Lewis and Wasatch Formations. The approximate planned drilling depth for a gas well drilled in the Mesaverde/Lewis Formations is 5,500 feet to 7,000 feet, and will take approximately 5 days to drill and 15 days to complete. The approximate planned drilling depth for a gas well drilled into the Wasatch Formation is 1,200 feet to 2,400 feet and will take about 2 days to drill and 2 days

APPENDIX A

to complete, barring any major drilling problems. Merit currently plans to drill most of the wells in the South Baggs analysis area utilizing conventional vertical drilling techniques. Other drilling procedures may possibly be used in addition to conventional vertical methods. These techniques include utilizing a workover rig or coiled tubing drilling methods. Drilling with a workover rig will utilize drilling techniques similar to conventional vertical methods, but will require a smaller surface pad to operate. Coiled tubing drilling will utilize a coiled tubing unit to drill the well in place of drilling rig. Because the coiled tubing is continuous tubing rolled on a spool, there is no need for drill pipe connections. Coiled tubing can not be rotated at surface, so torque at the bit is created by use of mud motors in the bottom hole assembly. This method will require associated mud handling equipment and a crane to run production tubulars. Possible advantages of coiled tubing drilling include a smaller drill site due to smaller size drilling equipment and the lack of drill pipe connections resulting in faster drilling and possibly lighter mud to control pressure during drilling operations. Specific information regarding any drilling method utilized will be provided in the individual well APD.

Water, for drilling and service trailer use, will be obtained from State of Wyoming approved locations or local water source wells. Water requirements for drilling average approximately 2,000 barrels (bbls) per well drilled in the Wasatch Formation (84,000 gallons), and 5,000 bbls per well drilled in the Lewis/Mesaverde Formation (210,000 gallons). Merit intends to use freshwater-based mud for the majority of their drilling operations.

3.0 COMPLETION AND TESTING OPERATIONS

All access roads to the well site will remain in place for well servicing activities (i.e., maintenance, improvements, etc.) if drilling is productive. Partial reclamation will be completed on segments of the well pad and access road ROW no longer needed.

Well completion operations involve the placement and cementing of well casing. Well casing involves running steel casing pipe into the open borehole and cementing the pipe in place. A typical completed (cased) well bore diagram for a vertical well within the South Baggs area into the Mesaverde/Lewis and Wasatch Formations is shown in DEIS Figures 2-7, 2-8, 2-9, 2-10, and 2-11. Casing and cementing prevents drill hole cave-in and aquifer mixing, confines production to the well bore, and provides a means of controlling pressure to facilitate installation of surface and subsurface well equipment.

A typical cased well bore will consist of conductor pipe, surface casing, and production casing. Surface casing is set deep enough and cemented to the surface to protect freshwater aquifers. Surface casing is set at the start of drilling operations. Production casing and cement are set to prevent gas, oil, condensate, or water from migrating from formation to formation and to isolate producing zones. Setting and cementing of production casing provides separation and isolation from abnormally pressured zones, usable water zones, and other mineral deposits (Onshore Order No. 2). The well casing will then be perforated in the productive formation to allow the flow of hydrocarbons to the surface. Wells drilled into the Mesaverde/Lewis Formations will require approximately 1,500 to 3,000 barrels of water per well for completing and testing operations. Wells drilled into the Wasatch Formation will require less than 500 barrels of water per well for completing and testing operations. Most completions in the South Baggs area use a string of tubing that is

APPENDIX A

inserted in the casing to the top of the perforated productive zone to allow gas, condensate, and water to flow to the surface where it is collected, measured, and contained. The gas from all Formations will be estimated and flared through testing procedures. Depending on the rates of these flow tests, the Formations will be further evaluated for stimulations. Merit anticipates production testing to last approximately 3 to 4 weeks for each well.

Most wells in the South Baggs area routinely need to be hydraulically fractured to increase flow rates from the Lewis Formation or the Mesa Verde Group. Fracturing of producing geologic units (fracing) increases the formations production capability and stimulates gas flow. Nitrogen (N), fluids and proppants (i.e., propping agents used in fracturing jobs; see DEIS Glossary for description of proppants). are pumped under pressure down the wellbore and into the producing perforations. The pressurized fluids are returned to the surface where they are contained in a completion pit or frac tanks on location. For the next 5 to 15 days, the well will be evaluated and tested for performance. Gas and condensate produced during testing will be flared into the flare pit on location. The purpose of flaring is to determine the magnitude of flow and presence of combustible hydrocarbons.

Flaring of gas during completion operations will occur: (1) after the initial perforation of Wasatch Sands, if productive, and (2) during flowback operations following hydraulic fracture stimulation. Burnable products associated with flaring will be hydrocarbon gases and minor amounts of condensate. Incomplete combustion products (minor amounts of CO, NO_x) are possible. Anticipated duration of flaring is expected to be 4 to 5 days.

Water produced with gas is generally considered to be condensed water vapor of low total dissolved solids (TDS) content. Estimated volumes based on Petroleum Information, Inc. (PI) reported production data are less than 1 barrel of water per day (BWPD) per well. Disposal of water will be by means of a lined evaporation pit or pit tank. Also, produced water may be disposed of by trucking the water to the Mexican Flats water disposal project located 25 miles north of Baggs. Depending on timing of availability, quantity, and quality of produced water, some of the produced water could be used in well drilling and completion and pipeline construction and hydrostatic testing. In the event the well proves unproductive and the decision is made to abandon the well, the well will be plugged prior to abandonment. Abandonment plugging consists of setting cement plugs in the wellbore at specified intervals according to state and federal regulations. The cement plugs will be pressure tested as they are installed. These cement plugs will isolate and/or protect water, hydrocarbons, and other valuable deposits of other minerals by sealing off fluids in the formations penetrated by the well so that fluid from one formation will not escape into another formation or to the ground surface.

4.0 PRODUCTION OPERATIONS

Production operations within the project area occur on a year-round basis, occasionally limited by ground and site conditions. Production operations will require use and maintenance of access roads within the project area on a year-round basis. Typical road maintenance operations will occur during the summer and early fall months. Winter maintenance will include blading and blowing of snow from the access road as necessary.

APPENDIX A

Each individual natural gas production site will be approximately 1.5 acres (250 feet by 250 feet) as shown on DEIS Figure 2-3. Cut and fill slopes associated with each production well site will be reclaimed as prescribed in the individual well APD. Each producing well will be serviced by its own production facility. All wells will be manually operated, requiring daily site visits by a service vehicle. Facilities allowing for remote operation will not be used.

5.0 ANCILLARY FACILITIES

The Approved Action will utilize the existing ancillary facility infrastructure within the South Baggs project area where possible, including water disposal facilities and gas gathering pipelines. Merit proposed one new compressor site in the Proposed Action. This site will have a pad size of 250 feet by 250 feet that will result in approximately 1.4 acres of site disturbance.

All wells, pipelines, and associated ancillary production facilities such as water wells and water treatment and disposal facilities will be operated in a safe manner by Merit as set forth by standard industry operating procedures. Routine maintenance of producing wells will be necessary to maximize performance and detect potential difficulties with gas production operations. Each well location will be visited about every other day to ensure operations are proceeding in an efficient and safe manner. The visits will include checking separators, gauges, valves, fittings, and on-site storage of produced water and condensates. Routine on-site equipment maintenance will also be performed as necessary. Additionally, all roads and well locations will be regularly inspected and maintained to minimize erosion and assure safe operating conditions.

6.0 GEOPHYSICAL OPERATIONS

No additional geophysical operations are currently planned in the South Baggs project area and adjacent lands by Merit. Seismic data acquisition from previous seismic operations will be utilized by Merit for the expanded drilling and production operations.

7.0 SITE RESTORATION AND ABANDONMENT

Merit will completely reclaim all disturbed areas not needed for production activities. Reclamation will generally include: (1) complete cleanup of the disturbed areas (drill sites, access roads, etc.), (2) restoration of the disturbed areas to the ground contour that existed prior to construction, (3) replacement of topsoil over all disturbed areas, (4) ripping of disturbed areas to a depth of 12 to 18 inches, and (5) seeding of reclaimed areas with the seed mixture prescribed in the Reclamation Recommendations, Section III.

8.0 PROJECT-WIDE MITIGATION MEASURES AND PROCEDURES

Merit will implement the following mitigation measures, procedures, and management requirements on public lands to avoid or mitigate resource or other land use impacts. These mitigation measures

APPENDIX A

and procedures may be applied on privately owned surface if specified by the involved private surface owners. An exception to a mitigation measure and/or design feature may be approved on public land on a case-by-case basis when deemed appropriate by the BLM. An exception will be approved only after a thorough, site-specific analysis determined that the resource or land use for which the measure was put in place is not present or will not be significantly impacted.

8.1 Range Resources and Other Land Uses

Mitigation requirements listed under Soils, Vegetation and Wetlands, and Wildlife also apply to Range Resources and Other Land Uses.

1. Merit will coordinate with the affected livestock operators to ensure that livestock control structures remain functional during drilling and production operations.

8.2 Air Quality

1. All Bureau conducted or authorized activities (including natural gas development alternatives) will comply with applicable local, state, tribal and Federal air quality regulations and standards. Merit will adhere to all applicable ambient air quality standards, permit requirements (including preconstruction, testing, and operating permits), motorized equipment and other regulations, as required by the State of Wyoming, Department of Environmental Quality, Air Quality Division (WDEQ-AQD).
2. Merit will not allow burning garbage or refuse at well locations or other facilities. Any other open burning will be conducted under the permitting provisions of Section 13 of the Wyoming Air Quality Standards and Regulations (WDEQ-AQD 1989).
3. On Federal land, Merit will initiate immediate abatement of fugitive dust (by application of water, chemical dust suppressants, or other measures) when air quality, soil loss, or safety concerns are identified by the BLM or the WDEQ-AQD. These concerns include, but are not limited to, potential exceedances of applicable air quality standards. The BLM will approve the control measure, location, and application rates. If watering is the approved control measure, the operator must obtain the water from state-approved source(s).

8.3 Transportation

1. Existing roads will be used as collectors and local roads whenever possible. Standards for road design will be consistent with BLM Road Standards Manual Section 9113.
2. Roads not required for routine operation and maintenance of producing wells and ancillary facilities will be permanently blocked, reclaimed, and revegetated.
3. Areas with important resource values, steep slopes and fragile soils will be avoided where possible in planning for new roads.

APPENDIX A

8.4 Minerals/Paleontology

Mitigation measures presented in the Soils and Water Resources sections will avoid or minimize many of the potential impacts to the surface mineral resources. Protection of subsurface mineral resources from adverse impacts will be assured by following the BLM casing and cementing policy.

Paleontological resource values will be protected through the following mitigation measure:

1. If recommended by the BLM, each proposed facility located in areas with known and potential vertebrate paleontological resource significance (Class II) will be surveyed by a BLM-approved paleontologist prior to surface disturbance (USDI-BLM 1987b; 1990a). Also, if paleontological resources are discovered at any time during construction, all construction activities will halt and BLM personnel will be immediately notified. Work will not proceed until paleontological materials are properly evaluated by a qualified paleontologist.

8.5 Soils

1. Reduce the area of disturbance to the absolute minimum necessary for construction and production operations while providing for the safety of the operation. Merit will restrict off-road vehicle activity.
2. Where feasible, locate pipelines immediately adjacent to roads to avoid creating separate areas of disturbance and in order to reduce the total area of disturbance.
3. Implement measures identified in the reclamation guidelines (ROD, Section III), if and where needed throughout construction and rehabilitation activities.
4. Avoid using frozen or saturated soils as construction material.
5. Minimize construction activities in areas of steep slopes, and apply special slope stabilizing structures if construction cannot be avoided in these areas.
6. Design cutslopes in a manner that will allow retention of topsoil, surface treatment such as mulch, and subsequent revegetation.
7. Selectively strip and salvage topsoil or the best suitable medium for plant growth from all disturbed areas to a depth of up to 12 inches on all well pads.
8. Where possible, minimize disturbance to vegetated cuts and fills on existing roads that are improved.
9. Install runoff and erosion control measures such as water bars, berms, and interceptor ditches if needed, as prescribed in Section III of the ROD.
10. Install culverts for ephemeral and intermittent drainage crossings. Design all drainage crossing structures to carry the 25- to 50-year discharge event, or as otherwise directed

APPENDIX A

by the BLM.

11. Implement minor routing variations during access road layout to avoid steep slopes adjacent to ephemeral or intermittent drainage channels. Maintain a 100-foot wide buffer strip of natural vegetation where possible (not including wetland vegetation) between all construction activities and ephemeral and intermittent drainage channels.
12. Include adequate drainage control devices and measures in the road design (e.g., road berms and drainage ditches, diversion ditches, cross drains, culverts, out-sloping, and energy dissipators) at sufficient intervals and intensities to adequately control and direct surface runoff above, below, and within the road environment to avoid erosive concentrated flows. In conjunction with surface runoff or drainage control measures, use erosion control devices and measures such as temporary barriers, ditch blocks, erosion stops, mattes, mulches, and vegetative covers. Implement a revegetation program as soon as possible to re-establish the soil protection afforded by a vegetal cover.
13. Upon completion of construction activities, restore topography to near pre-existing contours at the well sites, along access roads and pipelines, and other facilities sites; replace up to 12 inches of topsoil or suitable plant growth material over all disturbed surfaces; apply fertilizer as required; seed (specified in the reclamation plan); and mulch.

8.6 Water Resources

Other mitigation measures listed in the Soils and Vegetation sections will also apply to Water Resources.

1. Implement measures identified in the Reclamation Recommendations (ROD, Section III) throughout construction and rehabilitation activities if needed.
2. Limit construction of drainage crossings to no-flow periods or low-flow periods.
3. Minimize the area of disturbance within perennial, ephemeral and intermittent drainage channel environments.
4. Prohibit construction of well sites, access roads, and pipelines within 500 feet of surface water and/or riparian areas. Possible exceptions to this will be granted by the BLM based on an environmental analysis and site-specific mitigation plans.
5. Design channel crossings to minimize changes in channel geometry and subsequent changes in flow hydraulics.
6. Maintain vegetation barriers occurring between construction activities and ephemeral and intermittent channels.
7. Design and construct interception ditches, sediment traps/silt fences, water bars, silt fences and revegetation and soil stabilization measures as identified in Appendix B if needed.

APPENDIX A

8. Construct channel crossings by pipelines such that the pipe is buried a minimum of four feet below the channel bottom.
9. Regrade disturbed channel beds to the original geometric configuration and the same or very similar bed material replaced.
10. Case wells during drilling, and case and cement all wells in accordance with Onshore Order No. 2 to protect all high quality water aquifers. High quality water aquifers are aquifers with known water quality of 10,000 TDS or less. Include well casing and welding of sufficient integrity to contain all fluids under high pressure during drilling and well completion. Further, wells will adhere to the appropriate BLM cementing policy.
11. Construct the reserve pit in cut rather than fill materials or compact and stabilize fill. Inspect the subsoil material of the pit to be constructed in order to assess soil stability and permeability and whether reinforcement and/or lining are required. If lining is required, line the reserve pit with a reinforced synthetic liner at least 12 mils in thickness and a bursting strength of 175 x 175 pounds per inch (ASTMD 75179). Consideration will be given to use of closed or semi-closed drilling systems in situations where a liner may be required.
12. Maintain two feet of freeboard on all reserve pits to ensure the reserve pits are not in danger of overflowing. Shut down drilling operations until the problem is corrected if leakage is found outside the pit.
13. Extract hydrostatic test water used in conjunction with pipeline testing and all water used during construction activities from sources with sufficient quantities and through appropriation permits approved by the State of Wyoming.
14. Discharge hydrostatic test water in a controlled manner onto an energy dissipator. The water is to be discharged onto undisturbed land that has vegetative cover, if possible, or into an established drainage channel. Prior to discharge, treat or filter the water to reduce pollutant levels or to settle out suspended particles if necessary. If discharged into an established drainage channel, the rate of discharge will not exceed the capacity of the channel to safely convey the increased flow. Coordinate all discharge of test water with the Wyoming State Engineer's Office (SEO) and the BLM.
15. Discharge all concentrated water flows within access road ROWs onto or through an energy dissipator structure (e.g., riprapped aprons and discharge points) and discharge into undisturbed vegetation.
16. Develop and implement a pollution prevention plan (PPP) for storm water runoff at drill sites as required per Wyoming Department of Environmental Quality (WDEQ) storm water National Pollution Discharge Elimination System (NPDES) permit requirements. The WDEQ requires operators to obtain a field permit for fields of 20 wells or more.
17. Exercise stringent precautions against pipeline breaks and other potential accidental discharges of toxic chemicals into adjacent streams. If liquid petroleum products are stored

APPENDIX A

on-site in sufficient quantities (per criteria contained in 40 CFR Part 112), a Spill Prevention Control and Countermeasures (SPCC) plan will be developed in accordance with 40 CFR Part 112, dated December 1973.

18. Coordinate all crossings or encroachments of waters of the U.S. with the U.S. Army Corps of Engineers (COE).

8.7 Fisheries

1. No fisheries mitigation is needed beyond that indicated under Water Resources (2.1.4.2.6) and Special Status Species Fish (2.1.4.2.10). The Windy Gap Decision (see Section 4.8 in Chapter 4 and the glossary) will be applied in the event of water depletion from the Little Snake River.

8.8 Vegetation and Wetlands

Other mitigation measures under Soils and Water Resources will also apply to vegetation and wetlands.

1. Implement guidelines identified in Appendix A, Section III of the ROD, if needed, throughout construction and rehabilitation activities.
2. Seed and stabilize disturbed areas with mixtures and treatment guidelines prescribed in Appendix B if needed.
3. File noxious weed monitoring forms with the BLM and implement, if necessary, a weed control and eradication program.
4. Evaluate all project facility sites for occurrence and distribution of waters of the U.S., special aquatic sites, and jurisdictional wetlands. All project facilities will be located out of these sensitive areas. If complete avoidance is not possible, minimize impacts through modification and minor relocations. Coordinate activities that involve dredge or fill into wetlands with the COE.
5. Complete a site-specific survey for plant species of concern and their habitat for the South Baggs project area prior to initiation of any ground-surface disturbance. If species of concern or their habitat are found, impacts will be minimized by avoiding these areas where possible and monitored. Minor adjustments to the location of project facilities will be made to avoid plant species of concern and/or their habitat. Copies of these surveys will be provided to the Resource Area Wildlife Biologist.

8.9 Wildlife

1. Require that regular drivers undergo training describing the types of wildlife in the area that are susceptible to vehicular collisions, the circumstances under which such collisions are likely to occur, and the measures that can be employed to minimize them.

APPENDIX A

2. During reclamation, establish a variety of forage species that are useful to resident herbivores based on the seed mixes presented in Appendix B or the BLM-approved seed mix.
3. Prohibit unnecessary off-site activities of operational personnel in the vicinity of the drill sites. Inform all project employees of applicable wildlife laws and penalties associated with unlawful take and harassment.
4. To facilitate big game movements and minimize the potential for injuries, do not fence access road ROWs.
5. Limit construction activities as per BLM authorizations within big game crucial winter range from November 15 to April 30.
6. Survey and clear well sites within one mile of raptor nests identified in the raptor survey prior to the commencement of drilling and construction during the raptor nesting period (February 1 through July 31).
7. When an 'active' raptor nest is within 0.75 to one mile (depending on species and line of sight) of a proposed well site, restrict construction during the critical nesting season for that species.
8. Do not perform construction activities within 0.25 mile of existing sage grouse leks at any time except as authorized in writing by exception, including documented supporting analysis, by the Authorizing Official.
9. Provide for sage grouse lek protection during the breeding, egg-laying and incubation period (March 1 - June 30) by restricting construction activities within a two-mile radius of active sage grouse leks. Exceptions may be granted if the activity will occur in unsuitable nesting habitat.
10. Construction activities within the Poison Basin migration corridor will be staggered so that they focus on only one area or zone at a time to allow migrating animals room to avoid and move around that zone
11. Drilling and construction activities within the Poison Basin migration corridor will be timed so that they do coincide with migration periods. The determination of specific dates and areas will be coordinated with the Wyoming Game and Fish Department.

8.10 Special Status Species

Special Status Plants

1. Merit will complete a site-specific survey for plant species of concern and their habitat for the South Baggs project area prior to initiation of any ground-surface disturbance. If species of concern or their habitat are found, impacts will be minimized by avoiding these

APPENDIX A

areas where possible and monitored. Minor adjustments to the location of project facilities will be made to avoid plant species of concern and/or their habitat. Copies of these surveys will be provided to the Resource Area Wildlife Biologist.

2. Employ site-specific recommendations developed by the BLM IDT for staked facilities.
3. Minimize impacts due to clearing and soil handling.
4. Monitor and control noxious weeds.
5. Comply with Section 404(b)(1) guidelines of the federal Clean Water Act (CWA).

Special Status Animals

Inventory and Monitoring

1. Because the status of raptor nests may change from year to year, an activity status survey for ferruginous hawk and bald eagle nests will be conducted immediately prior to construction to allow for well placement planning and the avoidance of impacts to actively nesting birds.
2. Although it is unlikely that the burrowing owl occurs in the project area, a survey for this species will be conducted if deemed necessary by the BLM. Determinations would be made on a case-by-case basis during ROW application review and the APD process.
3. The BLM will conduct black-footed ferret surveys near all project-related construction proposed within active or inactive prairie dog colonies prior to surface disturbance. Should black-footed ferrets be documented within the project area, impacts to the species and its habitat will be completely avoided.

Avoidance and Mitigation

1. Where the construction of well sites, roads, pipelines, and drilling activities within the buffer zone of raptor nest sites are likely to impact active raptor nests, such activities will be excluded between February 1 and July 31 for ferruginous hawks, or as determined by the BLM AO.
2. In order to reduce incidents of illegal kill and harassment of wildlife, all project workers will be instructed on local wildlife regulations and state wildlife laws and regulations should be posted in conspicuous places at the job sites. Personnel will also be instructed about the nature of the wildlife species that occur on the work site, potential impacts to these species, and measures that could be taken to avoid or minimize impacts. All unnecessary off-site activities of operational personnel will be prohibited.
3. The BLM will coordinate with the FWS to determine actions required in order to reduce the potential for mortality to special status bat species and migratory birds in reserve pits, and

APPENDIX A

to comply with FWS memorandum (1996) and the Migratory Bird Treaty Act of 1918.

4. Merit and the BLM will undergo consultation with the FWS in determining adequate buffer zones to protect the nesting pair of bald eagles adjacent to the project area and allow for well placement planning prior to construction. As a result, creation of an individualized management plan for this specific pair of bald eagles will be developed.
5. To reduce potential for vehicle-big game collisions and subsequent jeopardy to bald eagles feeding on road-killed carrion, require all drivers to undergo a training session describing the type of wildlife in the area that are susceptible to vehicular collisions, the circumstances under which such collisions are likely to occur, and the measures that could be employed to minimize them.
6. To avoid the risk of vehicles colliding with bald eagles that are feeding on road-killed carrion, removal of all carcasses from access roads, shoulders, and clear zones is necessary, particularly during the winter when carrion is a principle food source for bald eagles.
7. In the event the mountain plover is listed prior to the initiation of construction, a complete series of three mountain plover surveys will be performed according to U.S. Fish and Wildlife Service guidelines within potentially suitable habitats prior to construction in 2001.
8. In the event mountain plover is listed before clearance surveys can be completed, no wells will be placed in potentially suitable plover habitats. Following the completion of plover surveys, wells will be placed in potentially suitable plover habitats only if negative survey results are obtained.
9. During the interim between the date the Record of Decision is signed and the completion of plover surveys in 2001, specific mitigation measures to minimize effects of gas well development and operation on nesting plover will be developed in coordination with the U.S. Fish and Wildlife Service.

Special Status Fish

1. Apply the FWS Windy Gap Decision (see DEIS Chapter 4, Section 4.8 special status fish and the glossary) in the event of water depletion from the Little Snake River to offset possible impacts and avoid jeopardy to the endangered and candidate fish species of the mainstem Green River and Upper Colorado River Basin.

8.11 Visual Resources

1. Utilize existing topography to screen roads, pipeline corridors, drill rigs, well heads, and production facilities from view.
2. Paint well and central facilities site structures with flat colors (e.g., Carlsbad Canyon or Desert Brown) that blend with the adjacent surrounding undisturbed terrain, except for

APPENDIX A

structures that require safety coloration in accordance with Occupational Safety and Health Administration (OSHA) requirements.

8.12 Noise

1. Muffle and maintain all motorized equipment according to manufacturers' specifications.
2. In any area of operations (drill site, compressor site, etc.) where noise levels may exceed federal OSHA and MSHA safe limits, Merit will provide and require the use of proper personnel protective equipment by employees.

8.13 Recreation

Measures under Wildlife, Transportation, Soils, Health and Safety, and Water Resources apply to Recreation.

1. Minimize conflicts between project vehicles and equipment and recreation traffic by posting appropriate warning signs, implementing operator safety training, and requiring project vehicles to adhere to low speed limits.

8.14 Socioeconomics

1. Implement hiring policies that will encourage the use of local or regional workers who will not have to relocate to the area.
2. Coordinate project activities with ranching operations to minimize conflicts involving livestock movement or other ranch operations. This will include scheduling of project activities to minimize potential disturbance of large-scale livestock movements. Establish effective and frequent communication with affected ranchers to monitor and correct problems and coordinate scheduling.
3. Merit and its subcontractors will obtain Carbon County sales and use tax licenses for purchases made in conjunction with the project so that project-related sales and use tax revenues will be distributed to Carbon County.

8.15 Cultural Resources

1. If a site is considered eligible for, or is already on the National Register of Historic Places (NRHP), avoidance is the preferred method for mitigating adverse effects to that property.
2. Mitigation of adverse effects to cultural/historical properties that cannot be avoided will be accomplished by the preparation of a cultural resources mitigation plan.
3. If cultural resources are discovered at any time during construction, all construction activities will halt and the BLM Authorized Officer (AO) will be immediately notified. Work will not resume until a Notice to Proceed is issued by the BLM AO.

APPENDIX A

8.16 Health and Safety

Measures listed under Air Quality and Water Quality also apply to Health and Safety.

1. Sanitation facilities installed on the drill sites and any resident camp site locations will be approved by the WDEQ.
2. To minimize undue exposure to hazardous situations, require measures that will preclude the public from entering hazardous areas and place warning signs alerting the public of truck traffic.
3. Haul all garbage and rubbish from the drill site to a State-approved sanitary landfill for disposal. Collect and store any garbage or refuse materials on location prior to transport in containers approved by the BLM.
4. During construction and upon commencement of production operations, Merit will have a chemical or hazardous substance inventory for all such items that may be at the site. Merit will institute a Hazard Communication Program for its employees and will require subcontractor programs in accordance with OSHA 29 CFR 1910.1200. These programs are designed to educate and protect the employees and subcontractors with respect to any chemicals or hazardous substances that may be present in the work place. It will be required that as every chemical or hazardous material is brought on location, a Material Safety Data Sheet (MSDS) will accompany that material and will become part of the file kept at the field office as required by 29 CFR 1910.1200. All employees will receive the proper training in storage, handling, and disposal of hazardous substances.
5. Spill Prevention Control and Countermeasure Plans will be written and implemented as necessary in accordance with 40 CFR Part 112 to prevent discharge into navigable waters of the United States.
6. Chemical and hazardous materials will be inventoried and reported in accordance with the Superfund Amendments and Reauthorization Act (SARA) Title III. 40 CFR Part 335, if quantities exceeding 10,000 pounds or the threshold planning quantity (TPQ) are to be produced or stored in association with the Proposed Action. The appropriate Section 311 and 312 forms will be submitted at the required times to the State and County Emergency Management Coordinators and the local fire departments.
7. Any hazardous wastes, as defined by the Resource Conservation and Recovery Act (RCRA), will be transported and/or disposed of in accordance with all applicable federal, state, and local regulations.
8. Merit plans to design operations to severely limit or eliminate the need for Extremely Hazardous substances. Merit also plans to avoid the creation of hazardous wastes as defined by RCRA wherever possible.

APPENDIX A

The Hazardous Materials Management Plan (DEIS Appendix C) provides a summary of the hazardous chemicals that may be on a drilling or production site with examples of representative chemicals and associated physical and health hazards. At this time it is impossible to determine if these items will be stored in sufficient quantities to require reporting under SARA Title II, and in some cases, the items may not be on site at all. However, all items will become part of the Hazard Materials Management Plan where required, and employee training will be completed as required.

9.0 MONITORING

Monitoring is a requirement provided for in the Code of Federal Regulations (40 CFR 1501.2© and 1503.3). This regulation, in its requirements for the Record of Decision, states that "... [a] monitoring and enforcement program shall be adopted and summarized where applicable for any mitigation" (1505.2[c]). Specific monitoring that will be needed has been identified following the environmental impact analysis and is listed in DEIS Chapter 2 (Section 2.2.4) and Chapter 4, Mitigation Summary for each resource discipline. A summary of monitoring expectations for each resource discipline that requires monitoring is provided as follows.

9.1 Geology/Minerals/Paleontology

In addition to the predisturbance survey conducted as deemed appropriate by the BLM, specific and unavoidable high-value sites will be monitored as necessary by a qualified paleontologist during construction. If significant paleontological materials are found during construction, construction activities that could adversely affect the find will cease or be redirected, and the AO will be notified immediately by Merit or the subcontractor(s) to ensure proper handling of the discovery by a qualified paleontologist.

9.2 Soils

Merit will conduct regularly scheduled monitoring of erosion control structures within the project area to ensure maintenance of the operating integrity of these structures. Monitoring procedures and schedules will be specified in the APD or ROW grant. Appropriate remedial action will be taken by Merit to correct non-functioning structures.

Successful revegetation is defined as short-term attainment of native plant cover comparable to 50 percent of predisturbance cover within three years. The operator will be released from continued revegetation monitoring requirements when a site reaches 80 percent of predisturbance cover usually within five years.

Merit will be responsible for monitoring reclamation success and site stability using reclamation guidelines presented in Section III of the ROD.

9.3 Water Resources

Merit and the BLM will conduct regularly scheduled visual monitoring reconnaissance of surface

APPENDIX A

waters to detect changes in water quality resulting from sedimentation. Periodic water samples will be collected, analyzed, and evaluated at a qualified laboratory to ensure that produced water and water disposal methods, as well as any on site discharge, are in compliance with federal and State water quality standards. In addition, if waters are discharged to the surface, the quantity will be regularly monitored to ensure that releases do not exceed the abilities of existing drainage systems to convey discharge flows. Special care will be taken to reduce runoff from roads and well pads located close to the Little Snake River. Appropriate remedial actions will be immediately taken to correct any out-of-compliance conditions.

9.4 Vegetation and Wetlands

Merit and the BLM will monitor activities adjacent to wetlands and other waters of the U.S. to ensure that no unauthorized discharge of fill and/or excavation will disturb these areas. In cooperation with the BLM, the Operators will be responsible for monitoring revegetation success and noxious weed invasion and establishment using criteria specified in Section III of the ROD and in DEIS Section 4.3.2, Soils. The reclamation program shall include written documentation to be furnished to the BLM regarding the effectiveness and success of reclamation mitigation.

9.5 Wildlife

Merit, the BLM, and the WGFD will identify additional opportunities to mitigate for habitat loss. Merit, in cooperation with the BLM and WGFD, will monitor raptor nesting and sage grouse lek use both on and adjacent to the South Baggs development to ensure that these sensitive resources are protected throughout the life of the project. In addition, breeding bird surveys may be required periodically by the BLM. Merit and the BLM will also monitor project activity in big game crucial winter ranges during critical periods to ensure that no unauthorized use occurs and that authorized activities in these areas are conducted in the most efficient manner possible to limit potential adverse impacts.

Any big game, raptor, and game bird mortalities noted in the project area by Merit must be reported to the BLM, FWS, and/or the WGFD as soon as practical.

9.6 Special Status Species

If found at or proximal to a proposed project location (e.g., well site, pipeline or road ROW, or ancillary facility site) during site-specific surveys, flagged population boundaries of special status plants will be monitored by a BLM-approved botanist during earth-disturbing activities. Monitoring will ensure that provisions outlined by the BLM and FWS for protection of the special status plant species are adhered to throughout the construction of the facility. Periodic site-visits should occur by the BLM or an approved botanist during operation of the facility to ensure that no unforeseen impacts have occurred.

Any mortality of special status wildlife species in the South Baggs project area noted by Merit must be reported to the BLM and FWS as soon as practical.

Water consumption monitoring will occur per the "Windy Gap Process."

APPENDIX A

9.7 Cultural Resources

In addition to Class III inventories, construction activities may also be occasionally field-checked by the BLM or by a qualified, BLM-permitted archeologist. Field checking may include construction monitors or open trench inspections on pipelines. These measures are stipulated when there is reason to believe that there is a high potential for buried cultural resources that were not identified during the Class III surface inventory. If historic or prehistoric materials are discovered during construction, all activities at the site will cease immediately and the BLM Authorized Officer (AO) will be notified by Merit or the subcontractor(s) to ensure proper handling of the discovery by a qualified archeologist.

9.8 Transportation

Merit and the BLM will provide qualified representatives on the ground during construction to validate construction commensurate with the approved design. Road signs in the South Baggs project area will be maintained and monitored by Merit, who will conduct all maintenance and monitoring operations in a manner that will ensure that signs are in proper repair and placed in appropriate locations.

9.9 Health and Safety

Hazardous materials used, produced, transported, stored, and disposed of as a component of this project will be done in accordance with all federal and state rules and regulations. Any hazardous material spills will be handled as specified in SPCC plans and in Appendix C. Merit will be responsible for reporting spills and implementing applicable procedures, monitoring, and reporting requirements.

APPENDIX A

SECTION III

RECLAMATION GUIDELINES

1.0 INTRODUCTION

The following erosion control, revegetation, mitigation measures, and management recommendations are designed to attain successful rehabilitation of disturbed areas associated with the South Baggs Area (Project Area) Natural Gas Production project. These recommended measures are designed to establish the feasibility of reclaiming disturbances associated with this project. The recommendations were developed based on 1) Bureau of Land Management (BLM) Wyoming State Office reclamation policy (USDI-BLM 1990), 2) management directives presented in the Great Divide Resource Management Plan (RMP) (USDI-BLM 1990), 3) impacts identified in the Environmental Consequences chapter (Chapter 4) of the environmental impact statement (EIS), 4) coordination with BLM staff, and 5) through issues identified during the scoping process. The extent of possible disturbed areas to be reclaimed include the drill sites, access roads and pipeline rights-of-way (ROW), and staging areas. The following measures apply to the Approved Action. The measures presented in this section are designed to allow the project to be constructed without significant impacts to natural resources. Because of the large geographic area covered by the project and the lack of site-specific locations of project facilities, these measures are presented in a general, non-project specific manner. Final selection of the measures to be applied at any given location, and modifications of these measures, will be identified by the BLM in coordination with Merit.

This appendix provides recommendations only and therefore is ***not*** a reclamation plan. The final reclamation measures that will be applied should be based upon site-specific conditions and validation of these recommendations upon the approval of, and in agreement with, the BLM Authorized Officer (AO). These recommended measures describe how natural gas development activities should be managed to assure compliance with the resource management goals and objectives for the general area, applicable lease and unit area stipulations, and resource limitations identified during interdisciplinary (ID) team analyses. ***If deemed necessary in light of new facts (e.g., effectiveness of specific measures, cost feasibility, and/or availability of materials and supplies, etc.) or to minimize impacts, the following measures may be applied where and when needed, added to, modified, or selectively withheld by the Operators in agreement and consultation with the BLM AO.*** Initial monitoring for compliance and successful implementation of the mitigation measures will be under the direction of the operator. Final approval and release will be under the direction of the AO on federally-managed lands.

Reclamation measures covered in this appendix fall into two general categories: temporary and final reclamation. Temporary reclamation refers to measures applied to stabilize disturbed areas and to control runoff and erosion during time periods when application of final reclamation measures is not feasible or practicable. Final reclamation refers to measures that should be applied concurrently with completion of drilling and pipeline installation.

APPENDIX A

Reclamation potential may be limited by salinity, alkalinity, steep slopes, shallow soils, depth to bedrock, low precipitation, stoniness, high wind and water erosion, periodic flooding, short growing season, seasonably high water tables, and strong winds. Especially intensive land-use practices may be necessary to mitigate salt and sediment loading caused by surface-disturbing activities within the project area. Activity plans (e.g., applications for permit to drill [APDs]) will address site-specific problems, including monitoring for salt and sediment loading (USDI-BLM 1990).

In general, temporary reclamation measures will be applied to all areas not promptly reclaimed to final conditions within a specified time period whether due to adverse weather conditions, inability to secure needed materials, and/or seasonal constraints, etc. Temporary reclamation measures will be applied only as needed; as in most cases, final reclamation measures will be applied concurrently as sections of the project are completed. Temporary reclamation measures may be applied more rigorously to sensitive areas such as drainage channel crossings, steep slopes, and areas prone to high wind and water erosion. Temporary reclamation measures will include regrading the disturbed area to near predisturbance contour, respreading salvaged topsoil, mulching, and placing runoff and erosion control structures.

Final reclamation measures, in general, involve regrading the disturbed area to near predisturbance contour, respreading salvaged topsoil, applying soil amendments (if necessary), applying a prescribed seed mixture, mulching, and placing runoff and erosion control structures such as water bars and silt fences. The duration of the resultant impacts to the various vegetation community types depends in part on the success of implementation of the reclamation measures prescribed in this appendix and the time required for natural succession to return disturbed areas to predisturbance conditions after project completion.

Because wetlands are "waters of the U.S." and are therefore protected under the federal Clean Water Act (CWA), discharge of dredge or fill material into, and/or excavation of wetlands could require administrative coordination with the U.S. Army Corps of Engineers (COE) pursuant to the CWA and may require a Section 404 permit. The COE, based on the exact nature of the disturbance activity will determine the type of permit (Individual, Regional, or Nationwide) required according to the rules and regulations presented in the Federal Register (1986). Avoidance of waters of the U.S. and wetlands will be the highest priority. A suitable wetland mitigation plan will be developed for the areas of wetlands directly impacted due to project activities where avoidance is not practicable. Impact minimization will include reducing the area of disturbance in wetland areas as well as utilizing procedures specified by authorizing agencies to cross intermittent and ephemeral drainage channels and wetland areas.

Although intermittent and ephemeral drainage channels are not considered wetlands, the same requirements apply to the discharge of dredge and fill into them as for discharge into wetlands. Residual wetland impacts that could occur after maximum avoidance and/or impact minimization has been demonstrated will be mitigated according to the following order of priority: 1) avoidance; 2) impact minimization; 3) mitigation in-kind, on-site; 4) mitigation in-kind, off-site; 5) mitigation out-of-kind, on-site; and 6) mitigation out-of-kind, off-site. In addition, the following modes of mitigation will be implemented for wetland mitigation if avoidance and impact minimization are not feasible: 1) wetlands restoration; 2) wetlands creation; and 3) wetlands

APPENDIX A

enhancement. The wetlands mitigation plan will be designed to replace the area of impact and functional values associated with the disturbed area.

Appropriate BLM and Soil Conservation Service (SCS) range conservationists were contacted to determine agency-specific seeding recommendations at drill sites and along access road and pipeline ROWs. The recommended seed mixtures in this appendix were developed with input from these land management agencies. The reclamation measures recommended in this report assume that baseline data will be collected in various areas along the access road and pipeline ROWs and at drill sites prior to construction activities by an authorized reclamation scientist, or as directed by the AO.

2.0 OBJECTIVES

This appendix is designed to meet the following objectives for reclamation of the access road/pipeline ROW and the drill sites:

Short-Term (Temporary) Reclamation:

- Immediately stabilize the disturbed areas by mulching (if needed), providing runoff and erosion control, and through the establishment of new vegetation (required for problem areas; may be optional for other areas depending on consultation with the BLM).
- Control and minimize surface runoff, erosion, and sedimentation through the use of diversion and water treatment structures.

Long-Term (Final) Reclamation:

- Immediately stabilize the disturbed soil surface by mulching (if needed and as directed by the BLM), runoff and erosion control, and through the establishment of new vegetation. Adequate surface roughness will be provided to reduce runoff and to capture rainfall and snow melt.
- Control and minimize surface runoff, erosion, and sedimentation through the use of diversion and water treatment structures.
- Restore primary productivity of the site and establish vegetation that will provide for natural plant and community succession.
- Establish a vigorous stand of desirable plant species that will limit or preclude invasion of undesirable species, including noxious weeds.
- Revegetate the disturbed areas with plant species useful to wildlife and livestock.
- Enhance aesthetic values. In the long-term, reclaimed landscapes will have characteristics that approximate the visual quality of adjacent areas, including location, scale, shape, color, and orientation of major landscape features.

APPENDIX A

3.0 PERFORMANCE STANDARDS

The following performance standards will be used to determine the attainment of successful revegetation:

All Years:

- Protective cover. With the exception of active work areas, all disturbed highly erosive or sensitive areas to be left bare, unprotected, or unreclaimed for more than one month will have at least a 50 percent cover of protective material in the form of mulch, matting, or vegetative growth. All disturbed areas will have at least a 50 percent cover of protective material within six months.

Second Year (Final Reclamation):

- Seedling density. The density and abundance of desirable species is at least three to four seedlings per linear foot of drill row (if drilled) or transect (if broadcast). Vegetative transects will be established on a permanent basis so that transects can be measured annually through the five year monitoring period.
- Percent cover. Total vegetal cover will be at least 50 percent of predisturbance vegetal cover as measured along the reference transect for establishing baseline conditions.

By the Fifth Year (Final Reclamation):

- Percent cover. Total vegetal cover will be at least 80 percent of predisturbance vegetal cover as measured along the reference transect for establishing baseline conditions.
- Dominant species. Ninety percent of the revegetation consists of species included in the seed mix and/or occurs in the surrounding natural vegetation, or as deemed desirable by the BLM as measured along the reference transect for establishing baseline conditions.
- Erosion condition/soil surface factor. Erosion condition of the reclaimed areas is equal to or in better condition than that measured for the reference transect for establishing baseline conditions.

4.0 METHODS

4.1 Drill Site, Access Road, and Pipeline Right-of-Way Clearing and Topsoil Removal and Storage

Topsoil will be handled separately from subsoil materials. At all construction sites, topsoil will be stripped to provide for sufficient quantities to be respread to a depth of at least four to six inches over the disturbed areas to be reclaimed. In areas where deep soils exist (such as floodplains and drainage channel terraces), at least 12 inches of topsoil will be salvaged. Where soils are

APPENDIX A

shallow to bedrock or have a stony subsoil, topsoil should be salvaged as specified by the AO. Topsoil should be stockpiled separately from subsoil materials. Topsoil salvaged from drill sites and stored for more than one year should be bladed to a specified location at these areas, seeded with a prescribed seed mixture, and covered with mulch for protection from wind and water erosion and to discourage the invasion of weeds. Topsoil stockpiles should not exceed a depth of 2-feet. Topsoil should be stockpiled separately from other earth materials to preclude contamination or mixing and should be marked with signs and identified on Construction and Design plans. Runoff should be diverted around topsoil stockpiles to minimize erosion of topsoil materials. In most cases, disturbances will be reclaimed within one year. Therefore, it is unlikely that topsoil stockpiling for more than one year will be required. Salvaged topsoil from roads and drill sites will be respread over cut-and-fill surfaces not actively used during the production phase. Upon final reclamation at the end of the project life, topsoil spread on these surfaces will be used for the overall reclamation effort.

Operators are finding out that it is not always necessary to remove all vegetation and strip all topsoil within a pipeline ROW. In many areas, such as with deep soils on relatively flat smooth slopes with low gradients, it is possible to crush in-place rather than clear vegetation and leave topsoil in-place rather than blade and stockpile. This technique will reduce the magnitude and severity of disturbance impacts and hasten successful reclamation.

In federal jurisdictional wetland areas, vegetation will be cut off only to the ground level, leaving existing root systems intact. Cut vegetation should be removed from wetland areas for disposal. Grading activities should be limited to directly over pipeline trenches and access roads. At least 12 inches of topsoil should be salvaged and replaced except in areas with standing water or saturated soils. Use of construction equipment in wetland areas should be limited. Dirt, rockfill, or brush riprap should not be used to stabilize pipeline ROWs. If standing water or saturated soils are present, wide-track or balloon-tire construction equipment should be used or normal construction equipment should be operated on equipment pads or geotextile fabric overlain with gravel fill. Equipment pads etc., should be removed immediately upon completion of construction activities. Trench spoil should be placed at least 10 feet away from drainage channel banks for all minor and major drainage channel crossings.

4.2 Drill Site, Access Road, and Pipeline Right-of-Way Construction

4.2.1 Upland Areas

Uplands include all areas away from wetlands and alluvial bottomlands or other areas that have excess soil moisture for prolonged periods or have shallow water tables. Construction will be accomplished following site-specific Construction and Design plans and applicable agency specifications. At drill sites, and along the areas of access road or pipeline ROW traversing steep slopes, slope angles will be minimized to enhance retention of topsoil, and reduce erosion as well as facilitate revegetation, and subsequent reclamation success. Slope stabilizing revetment structures may be necessary in areas where the substrata materials are unconsolidated and loose and cannot be stabilized with revegetation and mulch.

APPENDIX A

Surface runoff will be controlled at all well sites through the use of interception ditches and berms. A berm approximately 18 inches high will be constructed around fill portions of these well sites to control and contain all surface runoff generated or fuel or petroleum product spills on the pad surface. Water contained on the drill pads will be treated in a detention pond prior to discharge into undisturbed areas in the same manner as discussed previously. This system will also serve to capture fuel and chemical spills, should they occur.

Erosion and sedimentation control measures and structures, as approved by the AO, will be installed on all disturbed areas. Soil erosion control will be accomplished on sites in highly erosive soils and steep areas with mulching, netting, tackifiers, hydromulch, matting, and excelsior. The type of control measure will depend on slope gradients and the susceptibility of soil to wind and water erosion. Silt fences will be placed at the base of all steep fill slopes and sensitive disturbed areas. All runoff and erosion control structures will be inspected periodically, cleaned out, and maintained in functional condition throughout the duration of construction and drilling. Water bars will be constructed on cut-and-fill slopes exceeding 25 feet long and 10 percent gradient using the water bar spacing guidelines and procedures specified for access road and pipeline ROW runoff and erosion control.

Runoff and erosion control along access road/pipeline ROWs will be accomplished by implementing standard cross drain, culvert, road ditch, and turnout design as well as timely mulching and revegetation of exposed cut, fill, and road shoulders. All culverts will be constructed with riprapped entrances and exits and with energy dissipators or other scour-reducing techniques where appropriate. Water discharged from culverts, cross drains, road ditches and turnouts will be directed into undisturbed vegetation away from all natural drainages. Erosion and sedimentation control measures and structures, as approved by the AO, will be installed across all cut-and-fill slopes within 100 feet of drainage channels. All runoff and erosion control structures will be inspected after major runoff events and at a regular schedule. If found to be sub-standard, these structures will be cleaned out and maintained in functional condition throughout the life of the project.

4.2.2 Drainage Channel Crossings

Construction of drainage channel crossings will minimize the disturbance to drainage channels and wetlands to the extent practicable and will occur during the low runoff period (June 15 through March 1), or as directed by the AO. Staging areas will be limited in size to the minimum necessary and will be located at least 50 feet from drainage channel bottoms, where topographic conditions permit. Hazardous materials will not be stored and equipment will not be refueled within 100 feet of drainage channels. Drainage channel crossings will be constructed as perpendicular to the axis of the drainage channel and at the narrowest positions as engineering and routing conditions permit. Clean gravel will be used for the upper one foot of fill over the backfilled pipeline trenches.

4.2.3 Wetlands

Access roads and pipelines will be rerouted, and drill sites located, to avoid wetland areas to the maximum extent practicable. The size of staging areas will be limited to the minimum necessary

APPENDIX A

and all staging areas will be located at least 50 feet from the edge of federally delineated wetland areas, where topographic conditions permit. The width of the access road and pipeline construction ROW will be limited to no more than 50 feet. Hazardous materials will not be stored and equipment will not be refueled within 100 feet of wetland boundaries. Appropriate permits will be secured from the COE prior to any construction activities in federal jurisdictional wetland areas.

4.3 Surface Runoff and Erosion Control

4.3.1 Drill Site, Access Road, and Pipeline Right-of-Way

4.3.1.1 Temporary Reclamation

Temporary erosion control measures will include application of mulch and netting of biodegradable erosion control blankets stapled firmly to the soil surface, respreading scalped vegetation, construction of water bars, or other procedures as directed by the AO. See Final Reclamation measures for specific information pertaining to mulching.

The actual distance of a pipeline/road ROW requiring stabilization on each side of a drainage channel will be determined on a site-specific basis as directed by the AO. To minimize sedimentation of drainage channels and wetlands during the interim period between construction activity and final reclamation, temporary erosion and sediment control measures will be applied. Silt fences or other sediment filtering devices such as weed-free straw bales will be installed at drainage channel banks where sedimentation is excessive and at the base of all slopes adjacent to wetlands. Exhibit B-1 presents schematics of water bar and silt fence construction. Sediment filtering devices will be cleaned out and maintained in functional condition throughout the life of the project. To avoid the possibility of mulching materials entering waterways, loose mulch (i.e., mulch not crimped into the soil surface, tackified, or incorporated into erosion control blankets) will not be applied to drainage channel banks.

If construction is completed more than 30 days prior to the specified seeding season for perennial vegetation, areas adjacent to the larger drainage channels will be covered with jute matting for a minimum of 50 feet on either side of the drainage channel. In addition, to protect soil from raindrop impact and subsequent erosion, 2.0 tons/acre of a weed-free straw mulch will be applied to all slopes greater than 10 percent. Temporary erosion control measures will include leaving the ROW in a roughened condition, respreading scalped vegetation, or applying mulch as specified by the AO. As indicated by several operators and the BLM, weed-free straw mulch is difficult to obtain in quantities and at costs suitable for all reclamation applications. Although this circumstance could reduce the application of the measure, the effectiveness of mulch in protecting the exposed soil from raindrop impact, erosion, and off-site sedimentation will not be ignored. In addition to its effectiveness in erosion control, mulching also benefits the soil as a plant growth medium in many cases. Therefore, effective mulching is fundamental to reducing soil erosion to acceptable, insignificant levels.

Trench breakers will be used for pipeline construction in certain areas to prevent the flow of water in either a trench that has been backfilled or temporarily left open. Trench breakers are

APPENDIX A

particularly important in wetland areas to minimize subsurface drainage. Trench breakers will be constructed such that the bottom of one breaker is at the same elevation as the top of the next breaker down slope, or every 50 feet, whichever is greater. Factors that control the application of trench breakers include the proximity to drainage channels and wetland areas, slope gradient, proximity of areas to shallow groundwater, and surface runoff source areas that can discharge water into the trench. Trench breakers will be installed, where necessary, as directed by the AO. Topsoil will not be used to construct trench breakers.

If a pipeline crosses roads at the base of slopes, vegetative strips will be maintained. If vegetation is disturbed within these limits, temporary sediment barriers such as silt fences and/or staked weed-free straw bales will be installed at the base of the slope adjacent to the road crossing. Temporary sediment barriers will remain in-place until permanent revegetation measures have been judged successful by the AO.

4.3.1.2 Final Reclamation

4.3.1.2.1 Upland Areas

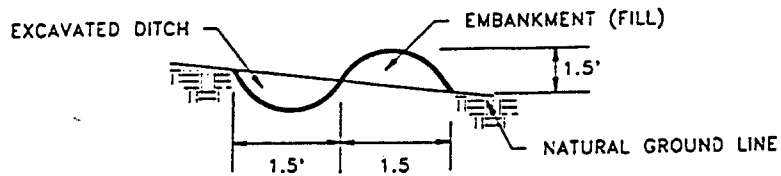
Runoff and erosion control along all ROWs will be accomplished by constructing sediment trapping devices (e.g., silt fences and straw bales) and water bars, as well as by timely mulching and revegetation of exposed disturbed areas. Runoff discharged from water bars will be directed into undisturbed vegetation away from all natural drainages. Erosion and sedimentation control measures and structures, as approved by the AO, will be installed across all cut-and-fill slopes. All runoff and erosion control structures will be inspected after major runoff events and at a regular schedule. If found to be substandard or ineffective, these structures will be cleaned out and maintained in functional condition until successful revegetation and soil stability is attained.

Water bars will be constructed across sideslopes at appropriate intervals according to slope gradient immediately following recontouring of the disturbed areas. The spacing will depend on whether mulching is applied in conjunction with placement of water bars. Water bars will be maintained in functional condition throughout the life of the project. If the integrity of the water bar system is disrupted during seeding, water bars will be repaired and broadcast seeded with the seed raked into the soil. Water bars will be constructed according to hillslope topography at the slope gradient intervals as shown in Table B-1, or as directed by the AO or landowner.

Water bars will be constructed 12 to 18 inches deep by digging a small trench and casting the soil material to the downhill side in a row. Each water bar will be initiated in undisturbed vegetation upslope, traverse the disturbed area perpendicular to the ROW at a gradient between one and two percent, and discharge water into undisturbed vegetation on the lower side of the disturbed area.

APPENDIX A

WATERBARS



Notes:

- All waterbars will be constructed between 1 and 2 percent gradient slope.
- Waterbars will initiate in and discharge into undisturbed vegetation on both sides of the well site.

SILT FENCE

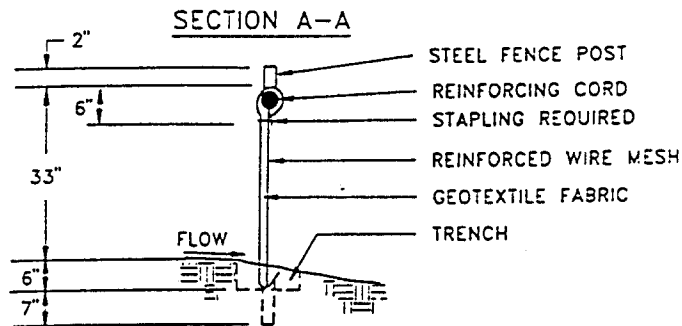
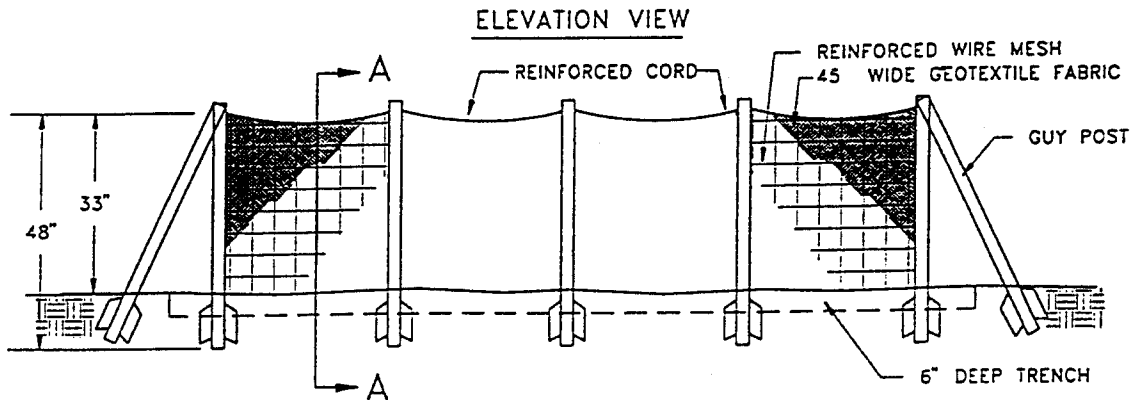
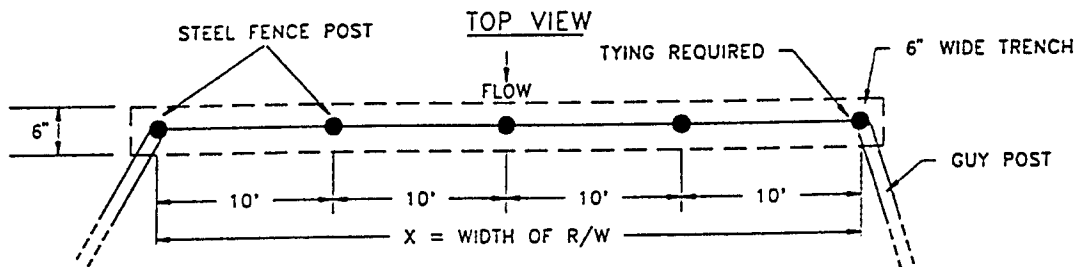


Exhibit A-1. Water Bar Construction and Silt Fence Construction.

APPENDIX A

Table A-1. Water Bar Intervals According to Slope Gradient¹.

With Mulching		Without Mulching	
Slope Gradient (percent)	Interval (feet)	Slope Gradient (percent)	Interval (feet)
10	150	10	100
15	100	15	75
20	50	20	45
30	40	30	40
40	35	40	35
50	30	50	30
>50	30	>50	30

¹ Based on Grah (1989).

4.3.1.2.2 Wetlands and Drainage Channel Crossings

Disturbance to the ephemeral and intermittent drainage channels will be avoided and/or minimized. All channel crossings not maintained for access roads will be restored to near predisturbance conditions. Drainage channel bank slope gradients will be regraded to conform with adjacent slope gradients. Channel crossings will be designed to minimize changes in channel geometry and subsequent changes in flow hydraulics. Culverts will be installed for ephemeral and intermittent drainage channel crossings. All drainage channel crossing structures will be designed to carry the 25- to 50-year discharge event as directed by the BLM. Silt fences will be constructed at the base of slopes at all drainage channel crossings. Minor routing variations will be implemented during access road, pipeline, and drill site layout to avoid washes. The area of disturbance in the vicinity of washes will be minimized. Per the Great Divide Resource Area Resource Management Plan (RMP), a 500-foot-wide buffer strip of natural vegetation will be maintained between all construction activities and drainage channels.

Trench plugs will be employed at non-flumed drainage crossings to prevent diversion of drainage channel flows into upland portions of pipeline trenches during construction. Application of riprap will be limited to areas where flow conditions prevent vegetative stabilization; riprap activities must comply with COE permit requirements. Pipeline trenches will be dewatered in such a manner that no silt laden water flows into active drainage channels (i.e., prior to discharge the water will be filtered through a silt fence, weed-free straw bales, or allowed to settle in a sediment detention pond).

4.4 Final Reclamation

4.4.1 Topsoil Respreading and Seedbed Preparation

In preparation for seeding, at least four to six inches of topsoil will be evenly respread over the

APPENDIX A

pipeline ROW, staging areas, cut-and-fill surfaces, and all areas of other sites not required for production purposes.

Soil compaction could result from heavy equipment working on disturbed soils prior to revegetation. Therefore, compaction is likely to occur under most situations. Soil compaction can inhibit adequate revegetation of disturbances. Therefore, all disturbances to be revegetated will be ripped to reduce the adverse effect of compaction. All disturbed areas will be ripped on 18- to 26-inch spacing and 12 to 16 inches deep. A spring tooth harrow equipped with utility or seedbed teeth, or ripper-teeth equipment mounted behind a large crawler tractor or patrol, as directed by the AO, will be used to loosen the subsoil. The subsoil surface will be left rough. After topsoil has been respread and if it is loose, it will be compacted with a cultipacker or similar implement to provide a firm seedbed. On steep slopes (greater than 40 percent and highly erosive), it may be difficult or impossible to replace topsoil and adequately prepare the seedbed. The disturbed areas on steep slopes will be ripped as described above. These areas will then be mulched with a hydromulch/seed/tackifier mix.

If implemented, erosion control blankets with seed incorporated into the matting will be installed per manufacturer's specifications to enhance soil stabilization.

4.4.2 Seed Application

All disturbed areas will be seeded immediately following the final grading of the topsoil to the approximate original contour, weather permitting. The seedbed will be prepared to a depth of three to four inches where possible to provide a firm seedbed. If hydroseeding or broadcast seeding is employed, the seedbed will be scarified to ensure good seed-soil contact. After completion of seedbed preparation, the seed mixtures presented in Tables B-2 through B-5, or a similar mix, as directed by the AO, will be applied according to the pure live seed (PLS) rates and drilling depths specified, to areas along the road and pipeline ROW, staging areas, and unused areas of drill sites that have been retopsoiled.

Seed will be used within 12 months of viability testing. Legume species purchased commercially must have been properly inoculated with nitrogen-fixing bacteria. Seed will be planted in the fall (after September 31) or no later than late fall (mid-November) prior to snow accumulation to avoid seed germination and breaking of dormancy and to prevent seedling frost damage; or in early Spring (prior to May 15); or as directed by the AO. Seed will preferably be planted with drill-type equipment such as a rangeland drill or billion seeder. Where the microtopography of the disturbed areas does not allow drill-type equipment, seed will be broadcast applied at twice the application rate of drilled seed. A spike-toothed harrow or similar equipment will be used where ripping has been insufficient to provide cover for the broadcast seed.

Any soil disturbance that occurs outside the recommended permanent seeding season, or any bare soil left unstabilized by vegetation, will be treated as a winter-construction problem and mulching will be considered, or the site stabilized and/or other actions taken as otherwise directed by the AO.

APPENDIX A

The seed mixtures presented in Tables B-2 through B-5, or similar mixtures as specified by the AO, will be applied according to specific areas identified to be homogeneous in terms of overall ecosystem similarities such as precipitation zones, elevational zones, dominant species herbaceous cover, soil types, and inherent limitations in reclamation success potential. Specifically, Seed Mixture #1 (Table B-2) will be applied to disturbances in the sagebrush-dominated mixed desert shrub and Juniper woodland community types. Seed Mixture #2 (Table B-3) will be applied to disturbances in the more moist alkaline mixed desert shrub community types. Seed Mixture #3 (Table B-4) will be applied to greasewood-dominated mixed desert shrub communities in alkaline valley bottoms and bluffs. Seed Mixture #4 (Table B-5) will be applied to disturbances in wet meadow community types. These seed mixes were developed based on the following criteria: 1) site-specific conditions of the analysis area; 2) usefulness of species in rapid site stabilization; 3) species success in revegetation efforts; and 4) current seed costs and availability. In general, native species are preferred to introduced species unless 1) an introduced species has been documented to better meet specific revegetation objectives, or 2) areas exist that are already covered by marginally desirable introduced species such as crested wheatgrass (*Agropyron cristatum*). Final seed mixes applied in the revegetation effort will be designed in coordination with the BLM.

Final determination of the appropriate seed mixture will be developed on a site-specific basis at the time of field review of the facility. Seeding rates may be varied to enhance the probability for maintaining the natural balance of species. Watershed protection must be emphasized when reclaiming disturbed areas. The composition of rare and native species, if encountered, will be taken into consideration at the time of seeding; however, appropriate measures must be taken to ensure that an adequate protection of the soil surface is obtained. Areas not exhibiting successful revegetation throughout the entire area disturbed by the project (as determined by the AO or Environmental Inspector), will be reseeded until an adequate cover of vegetation is established.

Private and agricultural lands will be seeded according to the landowner's request. Should the landowner not specify a recommended seed mixture, the AO will determine the appropriate seed mixture to apply.

4.4.3 Mulching

In sensitive sites where significant erosion (e.g., large areas of disturbance or areas with high erosion rates) is most likely to occur, the seeded access road/pipeline ROW, staging areas, and the portion of the drill pads not needed for production purposes will be mulched following seeding to protect the soil from wind and water erosion, raindrop impact, surface runoff, and noxious weed invasion, and to hold the seed in place. The exposed surface of disturbed areas, including topsoil stockpiles, may be protected by placing crimped straw mulch, hydromulch, biodegradable plastic netting and matting, or biodegradable erosion control blankets.

APPENDIX A

Table A-2. Seed Mixture¹ #1 - Mixed Desert Shrub, Badlands, and Juniper Woodland Community Types.

Species	Cultivar or Variety	Seed Application Drilled Rate (pls ² lbs/ac)	Planting Depth (if drilled) (inches)
Grasses			
Western wheatgrass (<i>Agropyron smithii</i>)	Rosanna	2.0	0.5
Bluebunch wheatgrass (<i>Agropyron spicatum</i>)	Secar	2.0	0.5
Bottlebrush squirreltail (<i>Sitanion hystrix</i>)	-	2.0	0.5
Indian ricegrass (<i>Oryzopsis hymenoides</i>)	Nezpar	2.0	0.5
Needle-and-Thread (<i>Stipa comata</i>)	-	2.0	0.5
Forbs			
Gooseberryleaf globemallow (<i>Sphaeralcea grossulariaefolia</i>)	-	1.0	0.5
Cicer milkvetch (<i>Astragalus cicer</i>)	Monarch	1.0	0.5
Shrubs			
Wyoming big sagebrush (<i>Artemisia tridentata</i>)	-	0.5	0.25
Antelope bitterbrush (<i>Purshia tridentata</i>)	-	1.0	0.5
Fourwing saltbush (<i>Atriplex canescens</i>)	-	1.0	0.5
TOTAL		14.5	

¹ Seed mix based on adaptation to the site conditions of the project, usefulness of species for rapid site stabilization, species success in revegetation efforts, and current seed availability and cost.

² PLS = pure live seed.

APPENDIX A

Table A-3. Seed Mixture¹ #2 - Moist Alkaline Areas in the Mixed Desert Shrub Community Type.

Species	Cultivar or Variety	Seed Application Drilled Rate (pls ² lbs/ac)	Planting Depth (if drilled) (inches)
Grasses			
Spike Muhly (<i>Muhlenbergia wrightii</i>)	El Vado	2.0	0.5
Alkaligrass (<i>Puccinellia distans</i>)	Fults	5.0	0.5
Alkali sacaton (<i>Sporobolus airoides</i>)	Salado	3.0	0.5
Forbs			
Strawberry clover (<i>Trifolium fragiferum</i>)	O'Connors, Salina	2.0	0.5
Shrubs			
Fourwing saltbush (<i>Atriplex canescens</i>)	-	1.0	0.5
Shadscale (<i>Atriplex confertifolia</i>)	-	1.0	0.5
TOTAL		14.0	

¹ Seed mix based on adaptation to the site conditions of the project, usefulness of species for rapid site stabilization, species success in revegetation efforts, and current seed availability and cost.

² PLS = pure live seed.

APPENDIX A

Table A-4. Seed Mixture¹ #3 - Greasewood-Dominated Valley Bottoms and Bluffs.

Species	Cultivar or Variety	Seed Application Drilled Rate (pls ² lbs/ac)	Planting Depth (if drilled) (inches)
Grasses			
Western wheatgrass (<i>Agropyron smithii</i>)	Rosanna	3.0	0.5
Pubescent wheatgrass (<i>Agropyron tricophorum</i>)	Luna	2.0	0.5
Alkali sacaton (<i>Sporobolus airoides</i>)	-	2.0	0.25
Russian wildrye (<i>Elymus junceus</i>)	Vinall	2.0	0.25
Forbs			
Cicer milkvetch (<i>Astragalus cicer</i>)	Monarch	3.0	0.5
Shrubs			
Fourwing saltbush (<i>Atriplex canescens</i>)	-	1.0	0.5
Gardner saltbush (<i>Atriplex gardneri</i>)	-	1.0	0.5
Winterfat (<i>Ceratoides lanata</i>)	-	1.0	0.5
TOTAL		15.0	

¹ Seed mix based on adaptation to the site conditions of the project, usefulness of species for rapid site stabilization, species success in revegetation efforts, and current seed availability and cost.

² PLS = pure live seed.

APPENDIX A

Table A-5. Seed Mixture¹ #4 - Wet Meadow Community Types.

Species	Cultivar or Variety	Seed Application Drilled Rate (pls ² lbs/ac)	Planting Depth (if drilled) (inches)
Grasses			
Spike muhly (<i>Muhlenbergia wrightii</i>)	El Vado	2.0	0.5
Redtop (<i>Agrostis stolonifera</i>)	-	1.0	0.5
Tufted hairgrass (<i>Deschampsia cespitosa</i>)	-	4.0	0.25
Forbs			
Red clover (<i>Trifolium pratense</i>)	Kenland	2.0	0.5
Strawberry clover (<i>Trifolium fragiferum</i>)	O'Connors, Salina	2.0	0.5
TOTAL		13.0	

¹ Seed mix based on adaptation to the site conditions of the project, usefulness of species for rapid site stabilization, species success in revegetation efforts, and current seed availability and cost.

² PLS = pure live seed.

All sensitive disturbed areas will be mulched immediately following seeding with 1.5 to 2.0 tons/acre of a weed-free straw mulch. Mulching materials will be free of noxious and undesirable plant species as defined by state or county lists. Hay mulch may be used, but it will be applied only if cost-competitive and if crimped into the soil. Straw mulch is more desirable than hay mulch because it is generally less palatable to wild horses, wildlife, and livestock. Additionally, there tends to be a higher risk of introducing undesirable species and noxious weeds with a hay mulch such as smooth brome, timothy, orchardgrass and other minor species. The lessee will maintain all disturbances relatively weed-free for the life of the project through implementation of a noxious weed monitoring and eradication program.

Wherever utilized, mulch will be spread uniformly so that at least 75 percent of the soil surface is covered. If a mulch blower is used, the straw strands will not be shredded less than eight inches in length to allow effective anchoring. On slopes less than 30 percent, straw mulch will be applied by a mechanical mulch blower at a rate of 2.0 tons/acre after seeding. The mulch will be crimped into the soil surface using a serrated disc crimper or similar implement as directed by the AO. Where broadcast straw mulch is applied on windswept slopes, a biodegradable plastic netting will be staked firmly to the soil surface over the mulch following the manufacturer's specifications. On slopes in excess of 40 percent or on slopes exceeding the operating capabilities of machinery, hydromulch or biodegradable erosion control blankets with seed

APPENDIX A

incorporated into the netting will be applied and staked firmly to the soil surface.

Where utilized, hydromulch and tackifier will be applied at a rate of 1,500 lbs/acre or as otherwise approved by the AO. In general, erosion control and soil stabilization are directly related to the amount of mulch applied. Under certain conditions where degradation processes are slow (e.g., in extremely hot or cold dry climates), a trade-off between the degree of effectiveness of mulch and long-term degradation will be considered. In extremely dry areas where mulch degradation may be slow, mulching rates will be reduced to 1.0 to 1.5 tons/acre or as specified by the AO.

On steeper slopes with highly erodible, shallow, rocky soils and/or on windswept areas with loose, unconsolidated materials, the above recommended measures may not be sufficient to reduce erosion to non-significant levels. The following measure will be considered by the operator and the BLM to stabilize such sites: incorporating a custom blend of seed into erosion control blankets. This method has proven cost-effective in many cases, with 98 percent of the cost being the blanket itself. The additional cost of incorporating seed into the blanket will average \$1.00 to \$1.50 per blanket, depending upon current seed costs. In most cases, this additional cost will offset the repeated efforts of broadcast seeding, manual raking of seeds into the soil, and mobilizing a labor force. The AO will determine the final measure(s) to be implemented in such areas.

4.4.4 Livestock Control

Livestock grazing will be monitored along all areas of drill sites and access road and pipeline ROW. If grazing is determined to be negatively impacting revegetation success, measures will be taken to immediately remove livestock from the newly reclaimed areas. Depending upon site-specific evaluations, it may be necessary to temporarily fence off certain riparian areas and wetlands to prevent excessive livestock grazing and trampling to enhance drainage channel bank stabilization and overall revegetation success. Existing livestock control structures such as fences and cattleguards will be maintained in functional condition during all phases of the project. Where access requires the disruption of an existing fence, a cattleguard will be installed at the access point.

4.4.5 Off-Road Vehicle Control

Off-road vehicle control measures will be installed and maintained as specified by the AO and landowners following the completion of seeding. Examples of practicable measures include a locking, heavy steel gate with fencing extending a reasonable distance to prevent bypassing the gate, with appropriate signs posted; a slash and timber barrier; a pipe barrier; a line of boulders; or signs posted at all points of access at intervals not to exceed 2,000 feet indicating "This Area Seeded for Wildlife Benefits and Erosion Control."

4.4.6 Fugitive Dust Control

If fugitive dust generated during construction of the drill sites, access road/pipeline ROWs, or staging areas become a problem, dust abatement measures will be implemented. Such procedures will be determined by the AO and will include applying water or water with additives (e.g., magnesium chloride) to the construction area at regular intervals, or as directed by the AO.

APPENDIX A

4.5 Monitoring and Maintenance

4.5.1 General

A designated official or responsible party will annually inspect and review the condition of all drill sites, access road/pipeline ROWs, and any other disturbed areas associated with the project. This official will assess the success of and prognosis for all runoff and erosion control and revegetation efforts, evaluate fugitive dust control needs, and recommend remediation measures, if necessary. In addition, monitoring will take place following each major runoff event. Photographs will be taken at drill sites and along access roads at specific areas each year to document the progress of the reclamation program at established photomonitoring points.

The following specific items will be monitored during inspections:

- revegetation success;
- sheet and rill erosion, gullies, slumping, and subsidence;
- soundness and effectiveness of erosion control measures;
- sediment filtering devices along all active ephemeral and intermittent drainage channels;
- water quality and quantity;
- noxious weed invasion;
- degree of rodent damage on seed and seedlings;
- locations of unauthorized off-highway vehicle (OHV) access;
- soundness and effectiveness of OHV control structures;
- evidence of livestock or wildlife grazing; and
- overgrazing/trampling of riparian and wetland areas.

4.5.2 Reclamation Success Monitoring

Reclamation success will be based upon the objectives specified in this appendix; therefore, monitoring will be tied to these objectives. The actual monitoring procedures for quantitative and qualitative evaluations of reclamation success will be implemented as specified by the BLM or other authorizing agencies.

Reclamation success will be monitored both in the short term (temporary reclamation) and in the long term (final reclamation). Monitoring of temporary reclamation measures will include visual observations of soil stability, condition, and effectiveness of mulching and runoff and erosion

APPENDIX A

control measures and a quantitative and qualitative evaluation of revegetation success, where appropriate. Long-term reclamation monitoring will include visual observations of soil stability, condition of the effectiveness of mulching and runoff and erosion control measures, and a quantitative and qualitative evaluation of revegetation success.

Revegetation success will be determined through monitoring and evaluation of percent ground cover to include a measure of vegetal cover (by species), litter/mulch, rock/gravel, and bare ground. Ground cover will be documented at each 1-foot interval along a 100-foot line intercept transect. Seedling density and relative abundance will be determined by selection of plots at the 20-, 40-, 60-, and 80-foot marks on the transect. Grazing impacts will be assessed as an ocular estimate of the percent utilization along the transect.

Soil stability will be measured using an erosion condition class/soil surface factor rating method to numerically rate soil movement, surface litter, surface rock, pedestalling, flow patterns, and rill-gully formation. Information obtained through this rating system represents an expression of current erosion activity and can be used to reflect revegetation success as a function of soil stability.

The access road boundaries, pipelines, and unused portions of the drill sites will be monitored until released by the AO upon attainment of 80 percent of predisturbance vegetative cover within five years of seeding. This standard will include 90 percent of the vegetative cover being comprised of desirable species and the erosion condition of the reclaimed area being equal to or in better condition than predisturbance conditions as prescribed under the Performance Standard section of this appendix.

4.5.3 Wetland and Drainage Channel Crossings

Wetland areas and natural drainage channel crossings will be monitored for a minimum of three years for noxious weed invasion and establishment of undesirable species. Noxious weeds will not be allowed to establish at any time. If found in a reclaimed wetland or drainage channel crossing, the noxious weeds will be removed. Undesirable species will not be allowed to establish. At the third year of monitoring, undesirable species should comprise no more than 15 percent of the total vegetation cover. The lessee will maintain wetland areas and drainage channel crossings according to this standard throughout the development of a noxious weed and undesirable species monitoring and eradication program.

4.5.4 Photomonitoring

Permanent photomonitoring points will be established at appropriate vantage locations that provide adequate visual access to drill sites, along pipeline and access road rights-of-way, and to ancillary facilities. Each photomonitoring point will be permanently marked with re-bar and identified on a topographic map of the area. The location of each point will be described in detail to assist in relocation from year to year. Photos will be taken at each photomonitoring point prior to initiation of construction. Photos, framing the same scene as previously taken, will be taken each year until reclamation standards have been met.

APPENDIX A

SECTION IV

HAZARDOUS MATERIALS MANAGEMENT PLAN

1.0 INTRODUCTION

Merit Energy Company (Merit) proposes to explore and develop natural gas reserves in the South Baggs Area of Carbon County, Wyoming. The Bureau of Land Management (BLM) has prepared an Environmental Impact Statement (EIS) for the proposed project, and this Hazardous Material Management Summary (HMMS), which is included as an appendix to the EIS, provides further specific information regarding the types and quantities of hazardous and extremely hazardous materials that are expected to be produced or used for the proposed project. Detailed descriptions of the proposed action and alternatives, the potential environmental consequences, and proposed mitigation and monitoring measures are provided in the EIS.

This HMMS is provided pursuant to BLM Instruction Memoranda Numbers WO-93-344 and WY-94-059, which require that all National Environmental Policy Act (NEPA) documents list and describe any hazardous and/or extremely hazardous materials that will be produced, used, stored, transported, or disposed of as a result of a proposed project. Hazardous materials, as defined herein, are those substances listed in the Environmental Protection Agency's (EPA's) *Consolidated List of Chemicals Subject to Reporting Under Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986*, and extremely hazardous materials are those identified in the EPA's *List of Extremely Hazardous Substances* (40 Code of Federal Regulations [CFR] 355). Materials identified on either of these lists that are expected to be used or produced by the proposed project are discussed herein.

A list of hazardous and extremely hazardous materials that are expected to be produced, used, stored, transported, or disposed of as a result of the South Baggs Project was obtained from Merit, along with Material Safety Data Sheets (MSDS) for all chemicals, compounds, and/or substances which may be used during the construction, drilling, completion, and production operations of the proposed project. Merit has reviewed the aforementioned EPA lists, as amended, and all materials included on either of these two lists that will be used or produced by the proposed project were identified.

Some potentially hazardous materials that may be used in small, unquantifiable amounts have been excluded from this HMMS. These materials may include: wastes, as defined by the Solid Waste Disposal Act; wood products' manufactured items and articles which do not release or otherwise result in exposure to a hazardous material under normal conditions of use (i.e., steel structures, automobiles, tires, etc.); food, drugs, tobacco products, and other miscellaneous substances (i.e., WD-40, gasket sealants, glues, etc.). No unauthorized use or disposal of these materials by project personnel will occur during project implementation, and all project personnel will be directed to properly dispose of these materials in an appropriate manner. Solid wastes generated at well locations will be collected in approved waste facilities (e.g., dumpsters), and each well location will be provided with one or more such facilities during drilling and completion operations. Solid wastes will be regularly removed from well locations and transported off the

APPENDIX A

South Baggs Area to approved disposal facilities.

2.0 HAZARDOUS MATERIALS

A listing of all relevant known hazardous and extremely hazardous materials that are expected to be used, produced, stored, transported, or disposed of during project implementation is provided herein. Where possible, the quantities of these materials have been estimated on a per-well basis and their use, storage, transport, and disposal methods described.

2.1 PRODUCTION PRODUCTS

The purpose of the proposed project is to extract natural gas from the Mesaverde/Lewis and Wasatch Formations and other formations underlying the South Baggs Area. Water will also be produced as a by-product of gas and oil extraction operations. Table C-1 lists and quantifies, where possible, the hazardous and extremely hazardous materials that may be found in these production products.

2.1.1 Natural Gas

Natural gas, primarily containing methane, ethane, and carbon dioxide, will be produced from approximately 50 wells at rates averaging 0.4 million cubic feet per day (mmcf/d) per well. No extremely hazardous materials are anticipated to be produced with the gas stream; however, the hazardous material hexane (CAS Number 110-54-3) will be present in the gas stream at volumes ranging from approximately 4 to 24 thousand cubic feet per day (mcf/d) per well (Table C-1). In addition, the gas will also likely contain small amounts of potentially hazardous polycyclic organic matter and polynuclear aromatic hydrocarbons. No other hazardous materials are known to occur within the natural gas stream.

The majority of gas produced from South Baggs wells will be transported from each location through newly constructed pipelines linking well locations to existing or newly constructed gas processing facilities. The natural gas will eventually be delivered to consumers for combustion. Small quantities of natural gas may be vented or flared at certain well locations during well testing operations. During testing, produced gas will be vented or flared into a flare pit pursuant to BLM/Wyoming Oil and Gas conservation Commission (WOGCC) rules and regulations (Notice to Lessees [NTL]-4A). BLM and WOGCC approval will be obtained prior to flaring or venting operations. No natural gas storage is anticipated by the proposed project.

Industry standard pipeline equipment, materials, techniques, and procedures in conformance with all applicable regulatory requirements will be employed during construction, testing, operation, and maintenance of the project to ensure pipeline safety and efficiency. All necessary authorizing actions for natural gas pipelines will be addressed prior to installation. These actions include:

- Carbon County special use permits,
- BLM rights-of-way (ROWs) applications,
- conformance with U.S. Department of Transportation (DOT) pipeline regulations (49 CFR 191-192), and

APPENDIX A

- Wyoming Public Service commission Certificates to act as common carrier for natural gas.

Table A-6. Hazardous and Extremely Hazardous Materials Potentially Produced by the South Baggs Area Natural Gas Project, Carbon County, Wyoming, 1996.

Production Product	Hazardous Constituents ¹	Extremely Hazardous Constituents ²	Approximate Qauntity Produced per Well ³
Natural Gas	-- Hexane PAHs ⁴ POM ⁵	None	0.4 mmcf 4-24 mcf
Condensates	-- PAHs POM	None	252 gpd
Produced Water	-- Lead Cadmium Chromium Radium 226 Uranium	None	168 gpd

¹ The hazardous constituents listed are, to the best of our present knowledge, those that are or may be present in the production products and are listed under the EPA's *Consolidated List of Chemicals Subject to Reporting Under Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986*, as amended.

² Extremely hazardous materials are those defined in 40 CFR 355.

³ mmcf = million cubic feet per day.
mcf = thousand cubic feet per day.
gpd = gallons per day.

⁴ PAHs = polynuclear aromatic hydrocarbons.

⁵ POM = polycyclic organic matter.

2.1.2 Condensates

Condensates will be produced with the gas stream at most of the proposed wells. Condensates primarily consist of long chain hydrocarbon liquids (e.g., octanes), but may also contain variable quantities of the following hazardous materials: polycyclic organic matter and polynuclear aromatic hydrocarbons. No other hazardous or extremely hazardous materials are known to be present in the condensates. The volume of condensate produced from South Baggs wells is anticipated to be approximately 252 gallons per day (gpd) from most wells (Table C-1).

APPENDIX A

Condensates will be stored in tanks at well locations and centralized facilities, and all tanks will be fenced and bermed to contain the entire storage capacity of the largest tank plus one foot of freeboard as mandated by the BLM. Condensates will be periodically removed from storage tanks and transported by truck, in adherence to DOT rules and regulations, off the South Baggs area. All necessary authorizing actions for the production, storage, and transport of condensates, including the Oil Pollution Act of 1990 (storage of >1,000,000 gal) as necessary, will be addressed prior to the initiation of condensate production activities.

2.1.3 Produced Water

Produced water from South Baggs wells is anticipated to range in volume from 0 to 630 gpd, and will average approximately 168 gpd for most wells (Table C-1). Produced water quality from wells within the South Baggs area is variable and will be monitored periodically. Based on WOGCC-required water quality analyses of produced water samples from several South Baggs wells, no hazardous or extremely hazardous materials are known to occur. However, water from the Wasatch and Mesaverde/Lewis Mesa Verde Formations at locations in the Washakie and Great Divide Basins is known to contain the following hazardous materials: lead (CAS 7439-92-1), cadmium (CAS 7440-43-9), chromium (CAS 7440-47-3), radium 226, and uranium. Water quality analyses of gross radiation for existing wells indicated only background radiation levels. No other hazardous or extremely hazardous materials are known to be present in the produced water.

Produced water will be stored in tanks at well locations and centralized facilities and will periodically be removed and transported by truck to the existing Wyoming Department of Environmental Quality (WDEQ) permitted disposal well facility. Where applicable, National Pollutant Discharge Elimination System (NPDES) permits will be obtained from the WDEQ, and produced water that meets applicable standards will be discharged to the surface at appropriate locations. All necessary authorizing actions will be met prior to the disposal of produced water including:

- BLM approval of disposal methodologies,
- RCRA compliance as necessary,
- WDEQ Water Quality Division (WDEQ-WQD) approval of wastewater disposal,
- WOGCC evaporation pond permits, and
- Wyoming State Engineer's Office (WSEO) dewatering permits (Form U.W. 5).

2.2 CONSTRUCTION, DRILLING, PRODUCTION, AND RECLAMATION

Known hazardous and extremely hazardous materials planned for use during typical construction, drilling, production, and reclamation operations for the proposed project are listed in Table C-2 and are described in detail below. Hazardous and extremely hazardous materials planned for use during project implementation fall into the following categories:

- fuels,
- lubricants,
- coolant/antifreeze and heat transfer agents,
- drilling fluids,
- fracturing fluids,
- cement and additives, and

APPENDIX A

- miscellaneous materials.

2.2.1 Fuels

Gasoline (CAS 8006-61-9), diesel fuel (CAS 68476-30-2), and natural gas are the fuels proposed for use by the project, and all contain materials deemed hazardous. Gasoline will be used to power vehicles providing transportation to and from South Baggs; diesel fuel will be used to power transport vehicles, drilling rigs, and construction equipment, and as a component of fracturing fluids (see Section 2.2.5); and natural gas will be used to power pipeline compressor stations.

2.2.1.1 Gasoline

Gasoline will be used to power vehicles traveling to and from the South Baggs. The hazardous and extremely hazardous materials likely to be found in gasoline are listed in Table C-2. The hazardous materials present in gasoline include: benzene (CAS 71-43-2), toluene (CAS 108-88-3), ethylbenzene (CAS 100-41-4), p-xylene (CAS 106-42-3), m-xylene (CAS 108-38-3), o-xylene (CAS 95-47-6), methyl tert-butyl ether (CAS 1634-04-4), polynuclear aromatic hydrocarbons, and polycyclic organic matter. Leaded gasoline contains tetraethyllead (CAS 78-00-2), which is listed as an extremely hazardous material (Table C-2).

Gasoline will be purchased outside the South Baggs project area from regional vendors, and will primarily be stored and transported in vehicle gas tanks. Some additional gasoline storage may be provided in appropriately designed and labeled 1 to 5 gallon containers for supplemental use as vehicle fuel. Gasoline will be used exclusively as a fuel for transport vehicles, being burned in internal combustion engines. No large scale storage of gasoline is anticipated.

2.2.1.2 Diesel Fuel

Diesel fuel for vehicle use will be used, transported, and stored as described in Section 2.2.1.1 for gasoline. Using the same assumptions as for gasoline, approximately 24,940 gallons of fuel will be required per well for proposed project transportation. Additional diesel fuel will be utilized to power drilling rigs (820 gal/well), workover rigs (440 gal/well), pumping equipment (600-700 gal/well), and road maintenance and reclamation equipment (550 gal/well). Diesel fuel will also be used as a fracturing fluid constituent (see Section 2.2.5).

Diesel fuel consists mainly of hydrocarbons containing from 15 to 25 carbons, and potentially contains hazardous materials, including: benzene, toluene, ethylbenzene, p-xylene, m-xylene, o-xylene, methyl tert-butyl ether, naphthalene, polynuclear aromatic hydrocarbons, and polycyclic organic matter. No extremely hazardous materials are known to be present in diesel fuel.

Each well location during drilling operations will have an aboveground storage tank containing diesel. These tanks will be filled as needed by a qualified, licensed fuel supplier, and use, transport, and storage of diesel fuel will be conducted in accordance with all relevant state and/or federal rules, regulations, and guidelines.

APPENDIX A

Table A-7. Hazardous and Extremely Hazardous Materials Potentially Utilized During Construction, Drilling, Production, and Reclamation Operations by the South Baggs Natural Gas Project, Carbon County, Wyoming, 1998.

Source	Hazardous Constituents ¹	Extremely Hazardous Constituents ²	Approximate Quantity Used Per Well ³
Fuel			
Gasoline	-- Benzene Toluene Ethylbenzene p-xylene m-xylene Methyl tert-butyl ether PAHs4 POM5 Tetraethyllead	-- Tetraethyllead	24,940 gal
Diesel Fuel	-- Benzene Toluene Ethylbenzene p-xylene m-xylene o-xylene Methyl tert-butyl ether Naphthalene PAHs POM	27,400 gal	
Natural Gas	-- Hexane PAHs POM	None	
Lubricants	-- PAHs POM Lead	None	> 8 gal

APPENDIX A

Source	Hazardous Constituents ¹	Extremely Hazardous Constituents ²	Approximate Quantity Used Per Well ³
	Cadmium Manganese Barium Zinc Lithium		
Coolant/Antifreeze and Heat Transfer Agents	-- Ehylene glycol Triethylene glycol	None	> 180 gal 330 gal
Drilling Fluid Additives			
Caustic Soda	-- Sodium hydroxide	None	650 lbs
Lime	-- Fine mineral fibers	None	3,500 lbs
Mica	-- Fine mineral fibers	None	600 lbs
Uni-Drill	-- Acrylamide	None	50 gal
Uni-Gel	-- Fine mineral fibers	None	43,500 lbs
UNIBAR	-- Barium compounds	None	8,200 lbs
Fracturing Fluid Additives			
LGC-VI w/diesel fuel	-- Benzene Toluene Ethylbenzene p-xylene m-xylene o-xylene Methyl tert-butyl ether	None	953 gal

APPENDIX A

Source	Hazardous Constituents ¹	Extremely Hazardous Constituents ²	Approximate Quantity Used Per Well ³
	Naphthalene PAHs POM		
OPTI-FLO III	-- Glycol ether	None	144 lbs
SSO-21	-- Methanol Glycol Ether	None	15 gal
CL-29	-- Formic acid Ammonium chloride Zirconium nitrate Zirconium sulfate	None	59 gal
BA-20	-- Acetic acid	None	38 gal
Sand	-- Fine mineral fibers	None	2,994 lbs
Cement and Additives	-- Fine mineral fibers PAHs POM	None	>10,000 lbs
Miscellaneous Materials	-- Methanol Corrosion inhibitors	None	3,000 gal

¹ The hazardous constituents listed are, to the best of our present knowledge, those that are or may be present in the production products and are listed under the EPA's *Consolidated List of Chemicals Subject to Reporting Under Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986*, as amended.

² Extremely hazardous materials are those defined in 40 CFR 355.

³ lb = pounds
gal = gallons.

⁴ PAHs = polynuclear aromatic hydrocarbons.

⁵ POM = polycyclic organic matter.

APPENDIX A

2.2.1.3 Natural Gas

An unknown volume of natural gas will be burned to provide power for the natural gas compressor stations required for efficient pipeline function. The natural gas used to power compressor stations will be produced by the proposed project, and hazardous materials contained in this natural gas are identified in Table C-2. Further detail on the transportation of natural gas as a result of the proposed project, and relevant authorizing actions for natural gas transportation, is provided in Section 2.1.1.

2.2.2 Lubricants

Various lubricants, including: motor oils, hydraulic oils, transmission oils, compressor lube oils (8 gal/well), and greases, will be utilized for project-required vehicles, rigs, compressors, and other machinery. Some of these lubricants will likely contain polynuclear aromatic hydrocarbons and polycyclic organic matter, and some may additionally contain compounds of lead, cadmium, nickel, copper, manganese, barium, zinc, and/or lithium. No extremely hazardous materials are known to be present in the lubricants required for the proposed project.

The quantity of each lubricant used, stored, transported, and disposed of is unknown; however, all lubricants will be used, stored, transported, and disposed of following manufacturer's guidelines. No unauthorized disposal of lubricants (e.g., disposal of used motor oil) will occur in South Baggs.

2.2.3 Coolant/Antifreeze and Heat Transfer Agents

Ethylene glycol (CAS 107-21-1) and triethylene glycol (CAS 112-27-6) will be utilized as coolant/antifreeze and heat transfer agents in association with this project (Table C-2). Ethylene glycol will be used as an engine coolant/antifreeze in automobiles, construction equipment, gas dehydrators, and drilling and workover rigs. An unspecified volume of this hazardous material will be stored and transported in engine radiators. In addition, both ethylene glycol and triethylene glycol will be used as heat transfer fluids during well completion and maintenance operations. The estimated quantity of ethylene glycol required per well for completion and maintenance operations is 180 gal for the life of the project. The quantity of triethylene glycol required will range from approximately 290 to 370 gallons/well. While the total volume of ethylene glycol to be used, stored, transported, and disposed of for the proposed project is unknown, any disposal of ethylene glycol and/or triethylene glycol will be conducted in accordance with all relevant federal and state rules and regulations.

2.2.4 Drilling Fluids

Water-based muds (drilling fluids) will be used for drilling each well. Drilling fluids consist of clays and other additives that are used in standard industry procedures. Drilling fluid additives to be utilized for the proposed project include: caustic soda (650 lbs/well), cedar fibers (200 lbs/well), lime (3,500 lbs/well), mica (600 lbs/well), Uni-Drill (50 gal/well), Uni-Gel (43,500 lbs/well), and paper (400 lbs/well) (Table C-2). All drilling operations will be conducted in compliance with applicable BLM, WOGCC, and WDEQ rules and regulations.

All known hazardous materials present in the proposed drilling fluids and additives are listed in Table C-4. These materials are: sodium hydroxide (CAS 1310-73-2), present in caustic soda; acrylamide (CAS 79-06-1), present in Uni-Drill (partially hydrolyzed polyacrylamide); barium compounds, present in UNIBAR (barium sulfate); and fine mineral fibers, present in lime, mica,

APPENDIX A

and Uni-Gel (sodium montmorillonite or barite). No hazardous materials are known to occur in sawdust or paper, and no extremely hazardous materials are known to be present in any of the drilling fluids and additives.

Drilling fluid additives will be transported to well locations during drilling operations in appropriate sacks and containers in compliance with DOT regulations. Drilling fluids, cuttings, and water will be stored in reserve pits, and pits will be fenced to protect wildlife from exposure. Netting (1 inch mesh), to protect waterfowl and other birds, and pit liners, to protect shallow groundwater aquifers, will be used on all reserve pits as deemed appropriate by the BLM.

When the reserve pit is no longer required, its contents will be evaporated or solidified in place, and the pit backfilled, as approved by the BLM. All reserve pit solidification procedures using flyash or other BLM-approved materials will be approved by the WOGCC and/or WDEQ prior to implementation. If necessary under special, unanticipated circumstances, reserve pit contents will be removed and disposed of at an appropriate facility in a manner commensurate with all relevant state and federal regulations.

2.2.5 Fracturing Fluids

Hydraulic fracturing is expected to be performed at some South Baggs wells to augment gas flow rates. Approximately 78,700 gallons of fracturing fluids, consisting primarily of fresh water, will be required per well for the proposed project. Fracturing fluid additives and their approximate volumes include: LGV-VI with diesel fuel (953 gal/well), GES-STA (150 lbs/well), OPTI-FLO III (144 lbs/well), CLAYFIX II (157 lbs/well), SSO-21 (15 gal/well), CL-29 (59 gal/well), BA-20 (38 gal/well), SP BREAKER (27 lbs/well), GBW-30 (9 lbs/well), BE-5 microbiocide (36 lbs/well), and sand (299,400 lbs/well) (Table C-2).

The hazardous materials present in fracturing fluid components are listed in Table C-2 and include: benzene, toluene, ethylbenzene, p-xylene, m-xylene, o-xylene, methyl tert-butyl ether, naphthalene, polynuclear aromatic hydrocarbons, and polycyclic organic matter contained in LGC-VI with diesel fuel (hydrocarbon gel concentrate); glycol ether present in OPTI-FLO III and SSO-21; methanol (CAS 67-56-1) present in SSO-21; formic acid (CAS 64-18-6), ammonium chloride (CAS 12125-02-9), zirconium nitrate (CAS 13746-89-9), and zirconium sulfate (CAS 14644-61-2) present in CL-29; acetic acid (CAS 64-19-7) present in BA-20; and fine mineral fibers present in sand. No hazardous materials are known to be present in GEL-STA (sodium salt), CLAYFIX II (alkylated quaternary chloride), SP BREAKER (sodium persulfate), GBW-30 (cellulase enzyme carbohydrate), and BE-5 (5-chloro-2-methyl-4-isothiazolin-3-one, 2-methyl-4-isothiazolin-3-one, a microbiocide). No extremely hazardous materials are known to be present in any of the fracturing fluid additives.

Fracturing fluids and additives will be transported to well locations in bulk (e.g., LGC-VI with diesel fuel, sand) or in appropriately designed and labeled containers (e.g., OPTI-FLO III in 50 lb fiber drums; SSO-21, CL-29, and BA-20 in 55 gal drums). All transportation of fracturing fluids and additives will be in adherence with DOT rules and regulations.

During fracturing, fluids are pumped under pressure down the well bore and out through perforations in the casing into the formation. The pressurized fluid enters the formation and induces hydraulic fractures. When the pressure is released at the surface, a portion of the fracturing fluids will be forced to the well bore and up into a tank. The fracturing fluids will then be transferred to lined reserve pits and evaporated, or hauled away from the location and reused or disposed of at an authorized facility. Decisions regarding the appropriate disposal of

APPENDIX A

fracturing fluids will be made by the BLM on a case-by-case basis.

2.2.6 Cement and Additives

Well completion and abandonment operations will entail cementing and plugging various segments of the well bore to protect freshwater aquifers and other down-hole resources. Materials potentially used for cementing operations include: cement, calcium hydroxide, calcium chloride, pozzlans, sodium bicarbonate, potassium chloride, and insulating oil. An unknown quantity of cement and additives, which may contain the hazardous material classes of fine mineral fibers, polycyclic organic matter, and polynuclear aromatic hydrocarbons, will be transported in bulk to each well site by a qualified cement supply company. Small quantities may be transported and stored on-site in 50 pound sacks. Wells will be cased and cemented as directed and approved by the BLM (for federal minerals) and WOGCC (for state and patented minerals). No extremely hazardous materials are known to be present in the cement and additives proposed for use by this project.

2.2.7 Miscellaneous Materials

Miscellaneous materials, potentially containing hazardous and/or extremely hazardous materials, that may be used for the proposed project include: methanol and corrosion inhibitors. The material will be transported to the site by qualified service and supply companies and will be used and disposed of following manufacturer's guidelines.

An unknown quantity of methanol will be used to de-ice well bores and as a hydrate preventer during completion and natural gas transport operations. Methanol is a listed hazardous chemical and will be stored, transported, used, and disposed of in adherence with all applicable federal and state rules, regulations, and guidelines.

2.3 COMBUSTION EMISSIONS

Combustion emissions from gasoline and diesel engines, as well as flaring natural gas, will occur as a result of this project. The complete oxidation of hydrocarbon fuels yields only carbon dioxide and water as combustion products; however, complete combustion is seldom achieved. Unburned hydrocarbons, particulate matter (e.g., carbon, metallic ash), carbon monoxide, nitrogen oxides, and possibly sulfur oxides will be expected as direct exhaust contaminants. Secondary contaminants will likely include the formation of ozone from the photolysis of nitrogen oxides. A listing of the hazardous and extremely hazardous materials potentially present in combustion emissions is provided in Table C-3.

APPENDIX A

Table A-8. Hazardous and Extremely Hazardous Materials Potentially Present in Combustion Emissions of the South Baggs Natural Gas Project, Carbon and County, Wyoming, 1996.

Emission	Hazardous Constituents ¹	Extremely Hazardous Constituents ²
Hydrocarbons	-- PAHs ³	None
Particulate Matter	-- Lead Cadmium Nickel Copper Manganese Barium Zinc Lithium	None
Gases	-- Nitrogen dioxide Sulfur dioxide Sulfur trioxide Ozone	-- Nitrogen dioxide Sulfur dioxide Sulfur trioxide Ozone

¹ The hazardous constituents listed are, to the best of our present knowledge, those that are or may be present in the production products and are listed under the EPA's *Consolidated List of Chemicals Subject to Reporting Under Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986*, as amended.

² Extremely hazardous materials are those defined in 40 CFR 355.

³ PAHs = polynuclear aromatic hydrocarbons.

Unburned hydrocarbons may contain potentially hazardous polynuclear aromatic hydrocarbons, and particulate matter may contain metal-based particulates from lead anti-knock compounds in the fuel, metallic lubricating oil additives, and engine wear particulates (Table C-3). Hazardous materials in the particulate matter may therefore include compounds of lead, cadmium, nickel, copper, manganese, barium, zinc, and /or lithium.

Nitrogen dioxide (CAS 10102-44-0), sulfur dioxide (CAS 7446-09-5), sulfur trioxide (CAS 7446-11-9), and ozone (CAS 10028-15-6) are probable combustion emissions, all classified as extremely hazardous materials. These materials will be either directly released in minor quantities from internal combustion engines, or will be formed through photolysis (i.e., ozone). No releases of these or other materials will occur in excess of those allowed for Prevention of Significant Deterioration Class II areas, WDEQ-Air Quality Division Implementation Plan; nor will releases occur that jeopardize National Ambient Air Quality Standards for South Baggs.

APPENDIX A

Particulate matter emissions and larger unburned hydrocarbons will eventually settle out on the ground surface, whereas gaseous emissions will react with other air constituents as components of the nitrogen, sulfur, and carbon cycles.

3.0 MANAGEMENT POLICY AND PROCEDURE

Merit and their contractors will ensure that all production, use, storage, transport, and disposal of hazardous and extremely hazardous materials as a result of the proposed project will be in strict accordance with all applicable existing, or hereafter promulgated federal, state, and local government rules, regulations, and guidelines. All project-related activities involving the production, use, and/or disposal of hazardous or extremely hazardous materials will be conducted in such a manner as to minimize potential environmental impacts.

Merit will comply with emergency reporting requirements for releases of hazardous materials. Any release of hazardous or extremely hazardous substances in excess of the reportable quantity, as established in 40 CFR 117, will be reported as required by the *Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980*, as amended. The materials for which such notification must be given are the extremely hazardous substances listed under the *Emergency Planning and Community Right to Know* Section 302 and the hazardous substances designated under Section 102 of CERCLA, as amended. If a reportable quantity of a hazardous or extremely hazardous substance is released, prompt notice of the release will be given to the BLM's Authorized Officer and all other appropriate federal and state agencies. Additionally, notice of any spill or leakage (i.e., undesirable event), as defined in BLM NTL-3A, will be given by Merit to the Authorized Officer and other such federal and state officials as required by law.

Merit has evaluated field operations in the South Baggs Area and have or will prepare and implement multiple plans and/or policies to ensure environmental protection from hazardous and extremely hazardous materials. These plans/policies shall be available for review at the BLM Great Divide Resource Area in Rawlins. These plans/policies include, where applicable:

- spill prevention and control countermeasure plans;
- oil/condensate spill response plans;
- inventories of hazardous chemical categories pursuant to Section 312 of the SARA, as amended; and
- emergency response plans.

Development operations in South Baggs will be in compliance with regulations promulgated under the Resource Conservation and Recovery Act (RCRA), Federal Water Pollution Control Act (Clean Water Act), Safe Drinking Water Act (SDWA), Toxic Substances Control Act (TSCA), Occupational Safety and Health Act (OSHA), and the Federal Clean Air Act (CAA). In addition, project operations will also comply with all attendant state rules and regulations relating to hazardous material reporting, transportation, management, and disposal.

APPENDIX A

Table A-9. Generic List of Hazardous Chemical Categories for the Oil and Gas Exploration and Production Industry.

Hazardous Chemical Category (With Examples of Representative Chemicals)	Physical and Health Hazards
Acetylene Gas (CAS#74-86-2)	Fire, sudden release of pressure
Acids Hydrochloric Acid (<30%)(CAS#7647-01-0) Hydrofluoric acid (<12%)(CAS#7664-39-3) Sulfuric acid (CAS#7664-93-9)	Immediate (Acute)
Alkalinity and pH Control Materials Calcium hydroxide (CAS#1305-62-0) Potassium hydroxide (CAS#1310-58-3) Soda ash (CAS#497-19-8) Sodium bicarbonate (CAS#144-55-8) Sodium carbonate (CAS#497-19-8) Sodium hydroxide (CAS#1310-73-2)	Immediate (Acute)
Biocides Amines Glutaraldehyde (CAS#111-30-8) Isopropyl alcohol (CAS#67-63-0) Thiozolin	Immediate (Acute), Fire
Breakers Ammonium persulfate (CAS#7727-54-0) Benzoic acid (CAS#65-85-0) Enzyme Sodium acetate (CAS#127-09-3) Sodium persulfate (CAS#7772-27-1)	Immediate (Acute), Fire
Buffers Sodium acetate (CAS#127-09-3) Sodium bicarbonate (CAS#144-55-8) Sodium carbonate (CAS#497-119-8) Sodium deacetate	Immediate (Acute)
Calcium Compounds Calcium bromide (CAS#71626-99-8) Calcium hypochlorite (CAS#7778-54-3) Calcium oxide (CAS#1305-78-8) Gypsum (CAS#10101-41-4) Lime (CAS#1305-78-8)	Immediate (Acute)
Cement (CAS#65997-15-1)	Immediate (Acute)
Hazardous Chemical Category (With Examples of Representative Chemicals)	Physical and Health Hazards
Cement Additives - Accelerators Calcium chloride (CAS#10035-04-8) Gypsum (CAS#10101-41-4) Potassium chloride Sodium chloride (CAS#7647-14-5) Sodium metasilicate	Immediate (Acute)

APPENDIX A

Cement Additives - Fluid Loss Cellulose polymer Latex	Immediate (Acute)
Cement Additives - Miscellaneous Cellulose flakes (CAS#9004-34-6) Coated aluminum Gilsonite (CAS#12002-43-6) Lime (CAS#1305-78-8) Long chain alcohols	Immediate (Acute)
Cement Additives - Retarders Cellulose polymer Lignosulfonates	Immediate (Acute)
Cement Additives - Weight Modification Barite (CAS#7727-43-7) Bentonite Diatomaceous earth (CAS#68855-54-9) Fly ash Glass beads Hematite (CAS#1317-60-8) Ilmenite Pozzolans	Immediate (Acute)
Chloride Salts Calcium chloride Potassium chloride Sodium chloride (CAS#7647-14-5) Zinc chloride (CAS#7646-85-7)	Immediate (Acute)
Chlorine Gas (CAS#7782-50-5)	Immediate (Acute), Sudden release of pressure
Hazardous Chemical Category (With Examples of Representative Chemicals)	Physical and Health Hazards
Corrosion Inhibitors 4-4' Methylene dianiline (CAS#101-77-9) Acetylenic alcohols Amine Formulations Ammonium bisulfite (CAS#10192-30-0) Basic zinc carbonate (CAS#3486-35-9) Gelatin Ironite sponge (CAS#1309-37-1) Sodium chromate (CAS#7775-11-3) Sodium dichromate (CAS#10588-01-9) Sodium polyacrylate Zinc lignosulfonate Zinc oxide (CAS#1314-13-2)	Immediate (Acute), Delayed (chronic), Fire
Crosslinkers Boron Compounds Organo-metallic complexes	Immediate (Acute), Fire

APPENDIX A

Defoaming Agents Aluminum stearate Fatty acid salt formation Mixed alcohols Silicones	Immediate (Acute)
Deflocculants Acrylic polymer Calcium lignosulfonate Chrome-free lignosulfonate Chromium lignosulfonate Iron lignosulfonate Quebracho Sodium acid pyrophosphate (SAPP) Sodium hexametaphosphate (CAS#10124-56-8) Sodium phosphate (oilfos) Sodium tetrphosphate Stryene, maleaic anhydride co-polymer salt Sulfo-methylated tannin	Immediate (Acute)
Detergents/Foamers Amphoteric surfactant formulation Ethoxylated phenol Detergents	Immediate (Acute), Fire
Explosives Charged well jet perforating gun, Class C explosives Detonators, Class A explosives Explosive power device, Class B	Sudden release of pressure
Hazardous Chemical Category (With Examples of Representative Chemicals)	Physical and Health Hazards
Filtration Control Agents Acrylamide AMPS copolymer Aniline formaldehyde copolymer hydrochlorite Causticized leonardite Sulfomethylated phenol formaldehyde Leonardite Partially hydrolyzed polyacrylamide Polyalkanolamine ester Polyamine acrylate Polyanionic cellulose Potassium lignite Preserved starch Sodium carboxymethyl cellulose (CAS#9004-32-4) Starch (CAS#9005-25-8) Vinylsulfonate copolymer	Immediate (Acute)
Flocculants Anionic polyacrylamide	Immediate (Acute)

APPENDIX A

Fluoride Generating Compounds Ammonium bifluoride (CAS#1341-49-7) Ammonium fluoride (CAS#12125-0108)	Immediate (Acute)
Friction Reducers Acrylamide methacrylate copolymers Sulfonates	Immediate (Acute)
Fuels Diesel (CAS#68476-34-6) Fuel oil Gasoline (CAS#8006-61-9)	Immediate (Acute), Delayed (Chronic), Fire
Gelling Agents Cellulose and guar derivatives	Immediate (Acute)
Gel Stabilizers Sulfites Thiosulfates	Immediate (Acute)
Hydrogen Sulfide (CAS#7783-06-4)	Immediate (Acute), Fire
Inert Gases Carbon Dioxide (CAS#124-38-9) Nitrogen (CAS#7727-37-9)	Immediate (Acute), Sudden release of pressure
Hazardous Chemical Category (With Examples of Representative Chemicals)	Physical and Health Hazards
Lost Circulation Materials Cane fibers Cedar fibers Cellophane fibers Corn cob Cottonseed hulls Mica (CAS#12001-26-2) Nut shells Paper Rock wool Sawdust	Immediate (Acute)
Lubricants, Drilling Mud Additives Graphite (CAS#7782-42-5) Mineral oil formulations Organo-fatty acid salt Vegetable oil formulations Walnut Shells	Immediate (Acute)
Lubricants, Engine Motor oil Grease	Immediate (Acute)
Miscellaneous Drilling Additives Diatomaceous Earth (CAS#68855-54-9) Oxalic acid (CAS#144-62-7) Potassium acetate (CAS#127-08-2) Zinc bromide (CAS#7699-45-8)	Immediate (Acute), Delayed (Chronic)

APPENDIX A

Odorants Mercaptans, aliphatic	Immediate (Acute)
Oil Based Mud Additives Amid polymer formulations Amine treated lignite Asphalt Diesel (CAS#68476-34-6) Gilsonite (CAS#12002-43-6) Mineral oil Organophilic clay Organophilic hectorite Petroleum distillate (CAS#8030-30-6) Polymerized organic acids Sulfonate surfactant	Immediate (Acute), Delayed (Chronic), Fire
Hazardous Chemical Category (With Examples of Representative Chemicals)	Physical and Health Hazards
Organic Acids Acetic acid (CAS#64-19-7) Acetic anhydride (CAS#108-24-7) Benzoic acid (CAS#65-85-0) Citric acid (CAS#5949-29-1) Formic acid (CAS#64-18-6) Organic acid salts	Immediate (Acute), Fire
Preservatives Dithiocarbamates Paraformaldehyde (CAS#30525-89-4) Isothiazions	Immediate (Acute)
Produced Hydrocarbons Condensate Crude oil (CAS#8002-05-9) Natural Gas	Immediate (Acute), Delayed (Chronic), Fire, Sudden release of pressure
Proppants Bauxite (CAS#1318-16-7) Resin coated sand Zirconium proppant	Immediate (Acute)
Radioactive, Special Form Cesium 137 (encapsulated) logging tool	Delayed (Chronic)
Resin and Resin Solutions Melamine resins Phenolic resins Polyglycol resins	Immediate (Acute), Fire

APPENDIX A

Salt Solutions Aluminum chloride (CAS#7446-70-0) Ammonium chloride (CAS#12125-02-9) Calcium bromide (CAS#17626-99-8) Calcium chloride (CAS#10035-04-8) Calcium sulfate (CAS#778-18-9) Ferrous sulfate (CAS#7782-63-0) Potassium chloride(CAS#7447-40-7) Sodium chloride (CAS#7647-14-5) Sodium sulfate (CAS#7757-82-6) Zinc bromide (CAS#7699-45-8) Zinc chloride (CAS#7646-85-7) Zinc sulfate	Immediate (Acute)
Hazardous Chemical Category (With Examples of Representative Chemicals)	Physical and Health Hazards
Scale Inhibitors Ethylenediaminetetraacetic acid (EDTA) (CAS#60-00-4) Inorganic phosphates Isopropanol (CAS#67-63-0) Nitrilotriacetic acid (NTA) (CAS#139-13-9) Organic phosphates Polyacrylate Polyphosphates	Immediate (Acute), Fire
Shale Control Additives Hydrolyzed polyacrylamide polymer Organo-aluminum complex Polyacrylate polymer Sulfonated asphaltic residuum	Immediate (Acute)
Silica	Immediate (Acute), Delayed (Chronic)
Solvents 1,1,1-Trichloroethane (CAS#71-55-6) Acetone (CAS#67-64-1) Aliphatic hydrocarbons Aromatic naphtha (CAS#8032-32-4) Carbon tetrachloride (CAS#56-23-5) Diacetone alcohol Ethylene glycol monobutyl ether (CAS#111-76-2) Kerosene (CAS#8008-20-6) Isopropanol (CAS#67-63-0) Methyl ethyl ketone (MEK) (CAS#78-93-3) Methyl isobutyl ketone (MIBK) (CAS#108-10-1) Methanol (CAS#67-56-1) t-Butyl alcohol (CAS#75-65-0) Toluene (CAS#108-88-3) Turpentine (CAS#8006-64-2) Xylene (CAS#1330-20-7)	Immediate (Acute), Delayed (Chronic), Fire

APPENDIX A

Spotting Fluids Nonoil base spotting fluid Oil base spotting fluid (diesel oil base) Oil base spotting fluid (mineral oil base) Sulfonated vegetable ester	Immediate (Acute), Fire
Surfactants - Corrosive Alcohol ether sulfates Amines Quarternary polyamine Sulfonic acids	Immediate (Acute)
Hazardous Chemical Category (With Examples of Representative Chemicals)	Physical and Health Hazards
Surfactants - Flammable Amines Ammonium salts Fatty alcohols Isopropanol (CAS#67-56-1) Oxylalkylated phenols Petroleum naphtha (CAS#8030-30-6) Sulfonates	Immediate (Acute), Fire
Surfactants - Miscellaneous Amine salts Glycols Phophonates	Immediate (Acute)
Temporary Blocking Agents Benzoic acid (CAS#65-85-0) Naphthalene (CAS#91-20-3) Petroleum wax polymers Sodium chloride (CAS#7647-14-5)	Immediate (Acute)
Viscosifiers Attapulgate Bentonite Guar gum (CAS#9000-30-0) Sepiolite Xantham gum	Immediate (Acute)
Weight Materials Barite (CAS#7727-43-7) Calcium carbonate (CAS#1317-65-3) Galena Hematite (CAS#1317-60-8) Siderite	Immediate (Acute)

APPENDIX B

U.S. FISH AND WILDLIFE SERVICE CORRESPONDENCE



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
4000 Morrie Avenue
Cheyenne, Wyoming 82001

ES-61411
pd/W.02/wy3846.pd

August 1, 2000

Memorandum

To: Kurt Kotter, Field Manager, Bureau of Land Management, Rawlins Field Office, Rawlins, Wyoming

From: Michael M. Long, Field Supervisor, U.S. Fish and Wildlife Service, Wyoming Field Office, Cheyenne, Wyoming *Michael M. Long*

Subject: Threatened and Endangered Species Concurrence for the South Baggs Area Natural Gas Field Development

This responds to your request for concurrence under the Endangered Species Act of 1973, as amended (Act), that the actions proposed in the South Baggs Area Natural Gas Field Development (project) in Carbon County, Wyoming are not likely to adversely affect any listed or proposed species.

The U.S. Fish and Wildlife Service (Service) has reviewed the submitted project description and evaluation of project effects, and concurs with your determination that none of the project activities are likely to adversely affect the black-footed ferret (*Mustela nigripes*) or bald eagle (*Haliaeetus leucocephalus*), and are not likely to jeopardize the mountain plover (*Charadrius montanus*). This concurrence is based, in part, on the mitigative measures proposed by the Bureau as provided in the Biological Assessment and its amendments. Our understanding of those mitigative measures are described below.

Black-footed Ferret

- While the amount of suitable black-footed ferret habitat in the project area is very limited, and does not meet the definition of a town as per the Service's 1989 guidelines, information determining whether or not black-footed ferret habitat within the project area is part of larger complex is lacking. Therefore, the Bureau of Land Management (Bureau) will conduct black-footed ferret surveys near all project-related construction proposed within active or inactive prairie dog colonies, prior to surface disturbance.
- Should black-footed ferrets be documented within the project area, impacts to the species and its habitat will be completely avoided.

Bald Eagle

- No surface disturbing or human activities will be authorized within one mile of an active bald eagle nest between February 15 through August 15. No well will be drilled closer than 3/4 mile of an active nest during the non-nesting season.

Mountain Plover

- For surface disturbing activities, surveys will be conducted within suitable plover habitat in accordance with Service's 1999 guidelines.
- If an active nest is found within the 200 meters of a proposed well and its support facilities, construction activities will be postponed until completion of the nesting season.
- To minimize the potential for vehicle collisions, project related night driving will be minimized. Reducing and enforcing speed limits on all roads should also minimize this problem.
- Should the mountain plover become listed before clearance surveys can be completed, no wells will be placed in potentially suitable plover habitats. Following completion of surveys, conducted in accordance with the Service's 1999 guidelines, wells will only be placed in potentially suitable habitats if no plovers are found.

We also concur that this project is not likely to jeopardize the whooping crane (*Grus americana*) since no impacts to wetlands will occur as a result of this project. We also concur this project is not likely to adversely affect the Colorado pikeminnow (*Ptychocheilus lucius*), humpback chub (*Gila cypha*), bonytail (*Gila elegans*), and razorback sucker (*Xyrauchen texanus*), or designated critical habitat for these fish, since there will be no surface or groundwater depletions to the Colorado River system as a result of this project development and operation.

Should project plans change, additional information on listed or proposed species become available, or a new species is listed or critical habitat designated that may be affected by the action, these determinations may be reconsidered and re-initiation of consultation may be required.

The above comments are provided in accordance with the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.). If you have any comments, please contact Pat Deibert of my staff at the letter head address, or by calling (307) 772-2374, ext. 26.